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# THE SIGHT-SAVING REVIEW

September, 1944

## **"Let There Be Sight"**

PUBLISHED QUARTERLY BY  
THE NATIONAL SOCIETY FOR THE  
PREVENTION OF BLINDNESS, INC.

Volume XI  
Number 3

ISOBEL JANOWICH, *Editor*

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*Price \$2.00 a year; single copies 50 cents*

Published quarterly by the National Society for the Prevention of Blindness, Inc. Office of Publication, 1315 Cherry Street, Philadelphia, Penna.; Editorial Office, 1790 Broadway, New York, N. Y.

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## Tell-Tale Eyes\*

A. L. Kornzweig, M.D.

THE author describes the eye as an indicator of conditions which affect the general health of the individual.

**M**OST people are surprised to learn of the great number of medical conditions that can be determined by an examination of the eyes. The average medical man looks at the eyes when he examines a patient. He limits himself to a few definite observations because he knows the value of those observations. The ophthalmologist, or eye physician, whose function it is to examine the eyes, looks for many more signs and symptoms which help him to make a diagnosis—not only of an eye defect, but of some general medical defect. In this sense, the eye examination is a part of the program of preventive medicine.

### What the Doctor Sees When He Looks at the Eye

One important fact the doctor observes when he looks at the eyes without the aid of any instrument is the prominence of the eyeballs. Even a layman can tell you, sometimes, that the eyes look prominent, that they look bigger than they normally should. This apparent increase in the prominence of the eye is an important symptom of many conditions. Primarily, it may be partly congenital in nature—normal for that particular individual. There are many people who are so-called “popeyed,” yet have no disease in the eyes or in the body. These individuals have what is known as shallow orbits, so that the normal eye is thrust forward slightly more than is usual. Or else, if they have a normal orbit or socket, the eye itself may be unusually large. Nearsighted eyes are large eyes, and many nearsighted individuals have prominent eyes. So the doctor has to determine whether the “popeye” is normal or abnormal.

\* This is one of a series of talks on preventive medicine to the laity, sponsored by the New York City Board of Health.

The history of the patient helps us a little bit. If he reports that he was always that way, it is all right; but if he says that the "popeyes" came on in the last few months, then the doctor must discover the reason. When the condition is present in both eyes, the most common cause is exophthalmic goiter, or thyroid disease. A hyperactive thyroid causes an increase in the rate of metabolism and also stimulates certain muscles of the eye which produce this peculiar condition. Sometimes, when the "popeye" is one-sided, the problem may be different. In these cases, the prominence may be due to something in the orbit pushing the eye out. An article in the *Journal of the American Medical Association*, January 4, 1941, lists all the conditions that may cause "popeye" on one side. Without going into a detailed explanation, but merely to demonstrate the number of conditions that can cause a unilateral "popeye" they are: (1) exophthalmic goiter, a condition which usually causes bilateral, but may cause unilateral, protrusion of the eyeball; (2) orbital tumor; (3) hyperostosis (increase in the bony structure); (4) hemangioma, which is a blood-vessel tumor; (5) xanthomatosis; (6) congenital defect of the orbit; and (7) cavernous sinus thrombosis. Of course, these names are merely words to the layman, but they are conditions which are kept in mind when the doctor sees such a patient.

#### What the Eyelids Disclose to the Doctor

A patient not infrequently seen is one who has what is known as a drooping lid—one eyelid will come down a little farther and cover the eyeball a little more than that of the other eye. This also means something to the observant physician. I am not referring to a local eye condition that may cause a swelling of the lid, *i.e.*, an inflammation, but rather to the general medical conditions that may cause such a drooping. The eyelid is supplied by certain nerves which control its function—the opening and closing of the eyes. If these nerves are not normal, the drooping eyelid may occur. There are two very well-known general conditions that manifest themselves this way: one of these is syphilis of the central nervous system; the other, a condition known as *myasthenia gravis*. A famous example of a victim of the first condition is the poet, Heinrich Heine. He had to raise his lids with his fingers in order to see the person to

whom he was speaking or the words he was writing. This occurred in his later years. Happily such conditions occur much less frequently now that syphilis is usually recognized early and treated before it attacks the central nervous system. *Myasthenia gravis* is a condition whereby the general musculature of the body becomes weak, and the eye muscles may be the first indicators of that condition. A cure for this condition, as well as for the better known disease, syphilis, is known. When it can be detected early, the cure has a much better chance of being effective.

### The Doctor Looks at the Pupils

We shall now examine the pupils of the eye. The pupil is the black spot in front of the eyes through which light enters into the interior of the eyeball, and through which we see. Conditions affecting the pupil are, therefore, of great importance to us. The pupil is by far one of the most important indicators in the eye that we have. The pupil acts as a shutter, getting bigger in dim light and smaller in bright light. The ability to react to light is important, and, as may have been noticed, whenever a doctor examines the eyes, he flashes a light into them. The purpose is not only to see what the eye looks like, but also to test the reaction of that eye to light, which is indicated by the shutting down of the pupil. This reaction is what every doctor looks for. The normal pupillary reaction may be missing in some general diseases of the body, notably syphilis. The pupil is fixed to light. It will not react. If the patient looks at an object near by, or accommodates, as we say, the pupil will contract. This peculiarity of the pupil not to react to light, but to react to accommodation, is known as the Argyll Robertson pupil, first discovered by this physician, and is one of the first indicators of syphilis of the central nervous system. But one must not be fooled by this sign. There is a condition known as Adie's syndrome, in which the pupil will also contract very poorly to light. The important difference here is that the pupil will also react very poorly to accommodation. It is therefore necessary for the doctor to be wary of making too hasty a diagnosis of syphilis just on the basis of the pupil's reaction to light.

Then, there is an inequality of the pupils. One pupil will be

larger than the other. This is not normal either. Where it is found, it is important to look for other signs of a condition known as Horner's syndrome, which is due to a disease of the sympathetic nervous system. Suppose a doctor looks at a person's eyes and finds that the pupils are pinpoint in size (by that we mean that they are contracted to the very smallest degree). Several things may cause this condition. The patient's eyes may have had drops which are used in the treatment of the eye disease known as glaucoma. Or he may be a morphine addict—a classical sign of morphine addiction is pinpoint pupils. Still another condition is syphilis, but in this last case the pupils are usually irregular, small, and different in both eyes. Of importance in negligence cases, automobile accidents, and such, is the condition of the pupil at the time of the accident and immediately after. The first signs of concussion of the brain are irregularities in size of the pupils and in their response to light. Thus one can see how much can be learned by the simple procedure of throwing a light into an eye.

Sometimes a patient comes to the doctor and says he sees double. What does that mean? Every object in some part of his field of vision, or in all parts, is duplicated. And as the doctor looks at the eyes, he finds that they are not parallel. One eye is turned in or out, up or down. Each eyeball has attached to its sides six muscles, the purpose of which is to rotate the eyeball in all directions: upwards, downwards, sideways, inwards, and outwards. All these muscles must work in harmony. When the eyes turn to the right, the muscles which are on that side contract—the opposing muscles on the left side of the eyeball relax. This means that there has to be a guiding point—a central intelligence which controls all these six muscles. By central is meant some area in the brain which is a driver, and which sees to it that the muscles work and act in harmony. I am sure you all must realize the difficulty that would be entailed in trying to get a team of six horses to work together. Now try to imagine two teams of six horses that must work in absolute harmony for perfect functioning. Suppose one of these muscles were weak, or paralyzed, as we say, and could not function. In this condition the eyes are no longer in alignment. Anyone having such a disease is conscious of the fact that he has two eyes, something those with normal eyes are not usually aware of, since

both eyes act as one. Each eye gets one image, but the brain fuses these images. Fusion occurs, however, only when these images fall on corresponding points in the back of the eye. This can happen only when the eyes are perfectly parallel and in alignment. As soon as the eyes are not in alignment, the images received are no longer at corresponding points, and the mind is unable to fuse those two images into one, and a double image results. The doctor must determine what has caused the condition. There are several medical conditions that might account for this. Diabetes is a common cause. Syphilis is another, brain tumors a third, orbital tumor a fourth, inflammations in the brain, such as meningitis or encephalitis, a fifth. Diseases of the spinal cord may produce the symptom. In several cases, where certain drugs have been injected into the spinal cord, a paralysis of the eye muscles has resulted. Injuries to the skull, concussion or fracture may cause the condition. The earliest sign, very often, is diplopia. A patient may not complain of diplopia because he still has sufficient strength in his muscles to bring about an alignment, even though the action of one may be weaker than the other. In these cases, diplopia can be brought out by one of several methods, the simplest of which is to cover one eye of the patient with a red glass. The difficulty of fusing two objects of dissimilar color very often is sufficient to uncover the diplopia due to a muscle that is weak but not fully paralyzed.

### **The Effect of Vitamins**

There has recently been considerable talk about vitamin deficiencies and their manifestations. Certain vitamin deficiencies show themselves exclusively by disturbances of the functions and appearance of the eyes. Night blindness is a condition characterized by the inability of the individual to see well at night. He can see perfectly well in the daytime, when the illumination is sufficient; but as soon as the illumination is cut down, he is unable to get around with any degree of comfort. Such a condition may be due to several causes. It may be an hereditary condition, which has been passed down from father to son; it may be due to an inflammatory condition; a disease in back of the eye; or it may be due to a deficiency of Vitamin A. The question of night blindness has been

given considerable discussion and importance, because accidents that occur at night have long been thought to be due to a possible defect of this kind. However, the experimental work that has been done to produce Vitamin A deficiency in man has shown that, in order to have such a disease, the deficiency must be severe, protracted, and prolonged. It is very seldom that such a condition will occur under ordinary circumstances of living in this country. People who drive cars usually ingest a sufficient amount of fat to prevent Vitamin A deficiency.

Then there is Vitamin B deficiency, which sometimes shows itself by an increased vascularity of the cornea. This is a rather recent finding, the importance of which has not yet been fully evaluated. In the southern communities of the United States, where pellagra exists to a greater degree than in the northern section of the country, it has been found that certain conditions of the eyes are greatly helped by the administration of riboflavin, which is part of the Vitamin B complex.

### **The Relation of the Eye to the Brain**

The human eye has sometimes been called a cerebral eye. This means that the eye is considered to be part of the brain, and it has been shown by a study of the development of the eye from its earliest appearance in the embryo that it is really an outpocketing of the brain. The nerve that goes to the eye and supplies the retina, which is the innermost lining of the eye, also goes backward to the brain. It crosses partly at a point known as the optic chiasm and then goes backwards to the posterior part of the cerebrum, where it finally terminates in the occipital lobe. In other words, visual impressions are obtained in front of the face through the eyes, but we really see with that portion of the brain which is in the back of the head. The nerve must traverse this entire distance; and it can readily be seen how disturbances anywhere along its course may cause some interference with vision. There is a method of examination which will detect defects in parts of the visual field. Each eye has a very wide field of vision. If a person looks straight in front at an object, without turning his head or his eyes, he can see his fingers move at the side or above or below. This is known as the field of vision. The sharpest vision, of course, is that which is



directly in front—the central vision. Certain diseases will affect the central vision, and others will affect the peripheral, or side, vision. We have instruments known as perimeters which show up these defects. A brain tumor may cut off half of the field of vision of both eyes, and leave the other half entirely intact. A hemorrhage in the brain can do a similar thing. Poisonings by arsenic, lead, methyl-alcohol, and so forth, will cut down the central vision but will leave the peripheral field of vision intact. Even a vitamin deficiency, especially of the Vitamin B<sub>1</sub> type, will show itself by a central defect. This may be cleared up completely by the administration of thiamin chloride, which is purified Vitamin B. All of this helps to prove the intimate relationship of the eye and the brain. As a matter of fact, the neurologists, who specialize in diseases of the brain, as well as the eye doctors, know how to study the fields of vision because it is so important an aid in diagnosis.

All these conditions are things which are picked up, if present, by the ophthalmologist when the eyes are examined. Sometimes the patient comes first to the oculist or seeks medical aid because of eye symptoms. From there, the patient is referred back to the general medical man or neurologist for further investigation and study.

### **The Retina as an Indication of General Health**

There is still another part of the eye where the eye doctor learns considerably more about the general condition of the patient than anywhere else in his examination. This part of the eye is called the retina. It is the innermost lining of the eye, as has already been mentioned, and is that portion which first receives the light stimulus, which is transmitted back to the brain. It is in this region that the blood vessels are seen in actual operation. Nowhere else in the body can the small arteries and veins be seen so readily, and any disease that affects them is certain to affect the blood vessels of the rest of the body. Hence, what we see in the back of the eye can tell us more about the general health of the patient; and in certain cases we can even prognosticate the life expectancy from the appearance of the retina.

High blood pressure, even in the early stages, can be diagnosed by the appearance of the retinal arteries. Headaches which are

attributed to the eyes often bring a patient to the eye doctor for the first examination. When the condition of the blood vessels is seen in the fundus of the eye, the patient can then be referred back to a medical man for proper care. Diabetes shows itself in the eyes by the appearance of little pinpoint hemorrhages. Anemias, either secondary to other conditions or the primary pernicious type, and other blood diseases, such as leukemias, give their tell-tale evidence in the fundus. The pallor of the background of the eye, plus hemorrhages and exudates due to weakened blood vessels, are seen in the retina. Numerous brain conditions, such as tumors, inflammations, and abscesses, will cause a swelling of the nerve head. This is of great diagnostic importance. Diseases which destroy the nerve can be noted by the pallor or atrophy of the optic nerve. Probably no part of the eye is regarded with such interest by general practitioners, as well as by eye men, as the retina. Recently, pictures of the back of the eye have been taken in natural colors, aided by the advances in photography, and these pictures are invaluable sources of information as to the progress of disease, and for the instruction of people vitally interested.

It can truly be said that the eyes tell a story, which, to the initiated, is full of meaning, and from which a wise patient benefits greatly.

## Helping America by Saving Sight in Childhood, Through Health Services\*

Roger E. Heering, M.D., M.P.H.

PRESENTS the responsibility of official and voluntary health agencies in the conservation of vision movement and points out what already has been accomplished through health services.

IN primitive man's struggle for existence he was very dependent upon the acuteness of his olfactory and auditory senses for his very survival. They warned him of danger and advised him as to whether to flee or whether the menace was within his capacity to handle. Today the tables are turned. Modern man is more dependent on his vision than on any other faculty and, as Dr. Brewster, of New Orleans, has said, "Next to death, the greatest tragedy befalling a human being is blindness."

Our job as members of official and voluntary health agencies is to apply the knowledge that science has given us to preserve the vision of our fellow men and to make provision that future generations may be equipped with normal faculties so essential to modern living.

### Causes of Blindness

Much of the economic loss and human disability due to blindness is a monument to the deficiencies in public health and medicine. Brewster says that 73 per cent is a conservative estimate of the proportion of blindness in Louisiana that could have been prevented. This figure is probably very nearly applicable to the United States as a whole.

Dr. Harry Best, in a recent *Survey Midmonthly*, stated that fortunately not less than three-fourths and perhaps nine-tenths of

\* Presented at the National Conference of Social Work, Atlantic City, N. J., June 2, 1941.

blindness is preventable—that it is the easiest of all human defects to reduce in incidence, and that its greatest cause is disease; another, accidents. Most cases resulting from these causes could have been prevented. He adds that a small proportion of blindness is of a hereditary character, not so fully understood, and not so easily conquered.

A report on the causes of blindness for the school year 1938–39 in schools and day classes for the blind, which was prepared by the Committee on Statistics of the Blind, yields some interesting data. This report classifies 3,868 cases as to cause. Among these children, 1,882, or 48.7 per cent, are placed under the heading, "Prenatal Origin." Of these 1,882 cases, heredity was reported as established in 60; presumed, in an additional 439; and the remaining 1,383 of the 1,882 cases were of prenatal origin, but the cause was not specified. Infectious diseases accounted for 23.8 per cent of the cases and trauma accounted for 8.5 per cent, most of which occurred during play or sport.

### General Diseases

General diseases, such as diabetes, nephritis, vascular diseases, diseases of the central nervous system, etc., were incriminated in 1.7 per cent. The control of some of these diseases means the prevention of acute conditions which may have as their sequelae degenerative processes which may involve the visual apparatus and its appendages.

With reference to neoplasms, which reportedly accounted for 2.8 per cent of the cases in the study, considerable encouragement could be derived from Dr. L. A. Scheele's paper, read before the New England Health Institute last April. Dr. Scheele indicated that definite progress was being made in the field of cancer control, which is indeed encouraging.

### Nutrition

Nutritional deficiency was not reported in this study as an important cause of blindness and was included in the category of general diseases. Less serious cases of visual impairment due to nutritional deficiency are undoubtedly much more common among children than these figures on causes of blindness would imply. In

spite of the fact that in recent years almost every purveyor of prepared foods and medicines has done much to make a farce of nutrition, and especially the vitamin question, the fact remains that there are dietary requirements which are essential to the normal development and function of the human organism. Incidentally, recent investigations reveal that conditions once thought to be the direct result of disease entities are due not to that entity *per se*, but to the effect of the disease on the assimilation and synthesization of certain factors that the body cannot successfully do without. For example, it has been shown that chronic alcoholism destroys the protein-digesting activity of certain gastro-intestinal enzymes, and it has been suggested that alcoholic polyneuritis may be caused, in part at least, by faulty digestion and assimilation of food resulting from the destruction of digestive enzymes by large quantities of alcohol taken over a considerable period of time.

I suspect that visual difficulties in children are more commonly attributable to dietary deficiencies, or, to be more specific, vitamin deficiencies, than has been reported. Most reports on ariboflavinosis, or the condition due to lack of the vitamin B complex, are concerned with the disease in adults, but Spies, Bean, Vilter, and Huff found that it occurs in any age group. From their studies among undernourished children in the South, they are convinced that lesions characteristic of the disease are more common than those of any other deficiency syndrome. In this condition, ocular involvement in the nature of conjunctivitis and keratitis are not uncommon.

In vitamin A deficiency we see night blindness due to the interference with the regeneration of visual purple in the retina. Dryness of the bulbar conjunctiva and softening of the cornea, which, if not corrected, may go on to keratitis and ulceration, may also result from insufficient vitamin A. Thus, it is evident that dietary factors must be re-emphasized in any program for the preservation of vision.

Although synthetic vitamins are proving useful in building and maintaining health, vitamins obtained from natural foods furnish cheaper, more palatable, and better balanced reinforcements. As Surgeon General Thomas Parran points out, "the coarse food dispensed to paupers in an English almshouse a century ago was rich

in vitamin B. Excellently nourished are the peasant peoples, whose primitive diet is whole grain bread, thick vegetable stews and plenty of milk and cheese. Their children are rosy-cheeked and vigorous, with strong teeth."

What happens when the needed elements are not supplied is vividly shown in another comment by Dr. Parran: "When I made my first trip to Denmark in 1926, I went to visit a home for blind children. Most of the youngsters from 12 to 16 years old were totally blind from a nutritional disease which appears when vitamin A is lacking for a long time from the diet. Since butter, cream, and cheese are rich in vitamin A, I asked my host how this could possibly happen in Denmark, which for centuries has been the dairy land of Northern Europe. He answered me bitterly, 'We sold their eyes abroad with the butter. During the World War we knew little about food except in terms of calories. We shipped out our dairy products and fed the children substitutes. Now they pay the price of our greed and ignorance.'"

### Infectious Diseases

Of the infectious diseases causing blindness or visual impairment among children, ophthalmia neonatorum and prenatal syphilis, or syphilis acquired *in utero*, head the list. Dr. Charles E. Stanford, of Minnesota, has related that the corneal scars of ophthalmia neonatorum should be a thing of the past as there is practically no excuse for the disease to occur.

Unfortunately, there are variations in the interpretation of what constitutes a case of ophthalmia neonatorum. In some states the term is interpreted to include any indication of inflammation of the eyes in the newborn from whatever cause. In other states the term is interpreted to include eye infections of any type and chemical irritations. The term is interpreted to include only infections of the eye in others, and in still others, ophthalmia neonatorum means only gonococcal infection of the eyes.

Probably 60 to 70 per cent of frankly purulent cases of ophthalmia neonatorum are of gonococcal origin. In 1879, Cr  d   introduced as a prophylactic the use of a solution of silver nitrate into the baby's conjunctival sac immediately after birth. The good results of this method are such as to justify criminal proceedings

upon those who fail to apply it in every case. Forty-five of the 48 states, and the District of Columbia, have a law or health department regulation requiring the use of a prophylactic for prevention of ophthalmia neonatorum. In 15 of these there are limitations in the law or regulation which does not make the use of the prophylactic mandatory if the parents object, or the law may require the prophylactic only where infection is suspected, or only in births in hospitals and maternity homes, and those attended by midwives.

Although not usually included in the provisions of the law for prevention of ophthalmia neonatorum, it is customary to include in the birth certificate a question concerning the use of a prophylactic in the eyes of the newborn. Thirty states include this type of question in the birth certificate.

All of the states have laws or health department regulations requiring the reporting of cases, but in 11 states the laws or regulations are so qualified that they do not cover all cases. The objective there is to insure early treatment, which is possible only if notification is prompt.

Crédé's method, though one of the triumphs of preventive medicine, does not strike at the root of the evil. To prevent gonorrheal ophthalmia, it is much better to try to eradicate gonorrhea from men and women, as we are trying to do today, than to drop silver nitrate into babies' eyes.

In the study of causes of blindness among children, 4.8 per cent of the cases had been attributed to prenatal syphilis by the examiners. However, this figure is believed to be an understatement, since it is difficult to determine the exact etiology in many of the cases in which the syphilis itself is no longer in an active stage, and some of the examining ophthalmologists in the schools for the blind still hesitate to attach this label to the child.

The source of prenatal syphilis is the mother—in other words, the infant acquires the disease *in utero*, and, as far as we know, this transmission of the *Treponema pallidum* from mother to unborn child usually takes place some time during or after the fourth month of pregnancy.

The child is often born with good eyes and evidence of syphilis either in the eyes or elsewhere may not be apparent. It is usually not until after the fourth year, and more commonly between the



fifth and sixteenth year, that interstitial keratitis becomes evident. Then the battle begins to try and save the eye from serious and permanent damage.

Interstitial keratitis is but one of the stigmata of prenatal syphilis that may be manifested by the congenital syphilitic. We ask ourselves why this blight upon the innocent when we have had the weapons of prevention for all these years. Our doctors are ready enough to report a case of smallpox and are more readily notifying the authorities of cases of open tuberculosis, but being human, they have shrunk from suspicioning that their patients might be tainted with syphilis. Consequently, as De Kruif says, "with no chance to know or to forfend it, mothers pass spirochetes through their blood to their unborn children, so that these babies are born dead before their time. Or, a mother may be so happy to give the world what seems a healthy baby who within a month begins to sicken, only to die before it speaks its first baby talk or begins to toddle. Worst of all, so patient is the syphilis spirochete that a boy or girl may grow to high school age, husky and brilliant in studies, with never a sign or outward hint of syphilitic sickness; then such a boy, pride of his mother, or girl, apple of her father's eye, may sicken, go insane with the terrible dementia called juvenile paresis.

"Or in others, the promise of fine careers may be blasted by a cloudiness, a curious veil, that forms slowly over the adolescent's eyes. For ten, fifteen, twenty years after a child is born from its unsuspecting mother, the evil spirochete will wait to strike him down with serious damage to vision or even blindness.

"Such are the perils of syphilis to the innocent."

Interstitial keratitis, referred to in the latter portion of De Kruif's quotation above, is but one of the more common causes of visual impairment in congenital syphilitics, optic nerve damage running a close second.

### **Legal Measures**

Fortunately, rather than wait for physicians and the public in general to awaken to its responsibilities, many states have taken steps which will provide an effective means of reducing the incidence of prenatal syphilis. We see these steps in the passage of



prenatal laws which require the expectant mother to have a blood test, and in the passage of premarital laws requiring that before a marriage license can be issued, one or both of the prospective partners must present competent evidence of freedom from syphilitic infection.

To date, 25 states have passed legislation designed to prevent the spread of syphilis through marriage by requiring that both the prospective bride and groom submit to examinations, including a serological test for syphilis, before the issuance of a marriage license, which is refused to those in whom the disease is or may become communicable. Twenty-four states are now seeking to prevent prenatal syphilis by requiring physicians or midwives in attendance upon expectant mothers to see that they have blood tests taken promptly so that maternal syphilis may be detected early enough to allow preventive prenatal antisyphilitic treatment.

The first law requiring a premarital examination and blood test for syphilis of both partners was passed in Connecticut in 1935; during the following two years, five states passed such legislation. The next year three more states were added, the next year, nine states; in 1940, six, and in 1941 to date, one more. The first legislation requiring prenatal blood tests was passed in 1938 in New Jersey, New York, and Rhode Island. In the year following, similar legislation was passed in 14 more states; during the past year, in five additional states; and 1941 to date, two states. That these laws will have a great deal of influence in helping us with the problem of preservation of vision or prevention of blindness cannot be denied.

As in the case of the use of a prophylactic in the eyes of the newborn, state health departments are beginning to incorporate into the birth certificate a question regarding the prenatal blood test of the mother for syphilis. For example, New Jersey asks the question, "Was a blood test for syphilis made?", and the date of the specimen is placed on the birth certificate, in order that the data obtained may be used to stimulate an examination and treatment early in pregnancy if necessary.

To prevent blindness and visual impairment due to the venereal diseases there must be more, however, than just legislation. In addition, adequate venereal disease control programs are needed,

with official agencies working in close harmony with voluntary agencies. If success is to be attained, there must also be whole-hearted co-operation on the part of the private physicians.

In view of the availability of a new and effective treatment for gonorrhea, provision is being made for expanding the venereal disease program to include gonorrhea control.

I have mentioned some of the legislative health measures which are either directly or indirectly important from the viewpoint of the conservation of sight. Other public health measures which have been incorporated into state laws or regulations, such as compulsory smallpox vaccination and communicable disease control regulations, especially trachoma, are also important prevention of blindness measures, although time does not permit our mentioning these in detail. I think it is also auspicious to mention the Act of July 9, 1918, under which was established an Interdepartmental Hygiene Board composed of the Secretaries of War, Navy, and Treasury, and setting up a Division of Venereal Diseases in the United States Public Health Service. Under this Act, states adopting standards set up by the Public Health Service could receive allotments of Federal funds for venereal disease control activities. This original Act was added to by the Act of May 24, 1938.

### **The Social Security Act and Sight Conservation**

The Social Security Act, approved by the President on August 14, 1935, provides for grants to states for maternal and child welfare under Title V; and Title VI provides for grants for public health work. Both Titles V and VI allow assistance to states to enable them to augment or establish facilities designed to improve public health services, and those activities which will be effective in the preservation of vision should be included.

The Social Security Act and the Venereal Disease Control Act provide the wherewithal and the stimulation for better public health methods, which are important whether we are concerned with the preservation of sight or the control of tuberculosis.

Another section of the Social Security Act (Title X) deals with aid to the blind on the basis of need. A desirable extension of that provision would be one allowing federal grants to any state, contingent upon the inauguration and carrying out of a restoration of

sight program for the blind and measures for the prevention of blindness. Such a procedure would be invaluable. It would give substantial impetus to the development of a vast campaign for the prevention of blindness which could not avoid considerably reducing the economic burden upon the public treasuries. There could hardly be anything more effective in bringing the states to the realization of their responsibilities in this matter.

### **Preschool and School Eye Examinations**

For the discovery of the individual child with eye difficulty we are dependent upon preschool examinations and school medical inspection procedures. For the solution of these problems we must rely upon the leadership of health and school authorities, and also upon the voluntary agencies which provide the stimulation, coordination and education essential to any health program.

Impaired eyesight is one of the commonest defects which stand in the way of a child's development and education. The earlier the defect is discovered, the sooner can be instituted investigation to determine the cause, which in turn will indicate methods of correction or prevention of further disability. Where the defect is of prenatal origin or due to a birth injury, it is possible to place responsibility upon the attendant at birth, for reporting the case to the health officer. This is another instance in which the birth certificate, or a supplemental form accompanying it, is being used to elicit the desired information. (As of January, 1940, twenty states were requiring reporting of congenital defects. Later figures on this point are not available.)

It is important that arrangements be developed for the ascertainment of defective vision in children of preschool age. Health centers for maternal and child welfare can be effective along these lines. Unfortunately, few of these services include careful vision tests at the present time, although it is well known that an adequate test can be made for children as young as three years.

In the case of school children the most important means of ascertainment of defective vision lies in the school medical inspection. Most states (41) have legislation for medical inspection of school children, although this is mandatory in only 21. The efforts of the school physician and nurse can be made effective only

through the active co-operation of the teachers. The teachers, with their opportunity of daily contact with their charges, are in a better position to detect symptoms pointing toward special sense defects than is either the school physician or nurse who sees the children only when there is need for special attention. For this reason it is highly desirable that there be incorporated into the curricula of teacher training institutions more information concerning eyes and an opportunity to acquire adequate techniques of vision testing and to learn to recognize symptoms which suggest the need for ophthalmological examination. A consulting ophthalmologist should be a part of the school health service, to insure adequate advice in instances of visual defects.

The successful care of children suffering from defective vision depends in large measure on the efficiency of arrangements for the follow-up of the individual children by school nurses. The nurses must keep in touch with children for whom glasses are prescribed to be sure that such glasses are actually obtained. The nurse should also see that children for whom periodic examinations have been recommended by the ophthalmologist attend the appropriate clinics and at the intervals advised. She should see, so far as she is able, that children for whom glasses have been obtained wear their glasses, and whether these children, through loss or damage, need new spectacles.

The visiting nurse, whether she be an agent of an official or voluntary agency, can do much, if she will, toward discovering visual defects in infants and young children and toward seeing that proper corrective steps are taken. The same applies to the physician in general practice.

In areas in which there is a special eye health problem among children, it is important that this problem be recognized and that adequate facilities be established to meet the need. An instance of this is the high prevalence of trachoma in the states of Kentucky, West Virginia, Tennessee, Missouri, Arkansas, Oklahoma and certain sections of Illinois, Indiana and Ohio. Following the proof by the U. S. Indian Service of the value of the sulfanilamide compounds in treatment of trachoma, many of these states have increased their efforts to eradicate this disease as a cause of blindness.

In a paper of this type it is impossible to discuss at length even the essential features of a program for conservation of vision of children. For those who are interested, however, there is a wealth of material available from the various health, welfare and safety agencies. Let us prepare for the future, then, by insuring, insofar as our knowledge and experience will allow, the health and welfare of our children and of our children's children.

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## Helping America by Saving Sight in Childhood, Through Integration of Services\*†

Theodate Haines Soule

"INTEGRATION is used to the end that the individual may have the fullest complement of sight possible as part of his equipment for life," says the author, and shows how the work of the departments of health, welfare, education, and other agencies are integrated to this end.

**T**HE word integration means the formation of a whole from constituent parts, and we might look first, in a general way, at those parts which are needed to make up the whole of a program for saving sight in childhood.

### Departments of Health

Let us begin with the program of state departments of health, which for a long time have been engaged in campaigns to prevent blindness by means of service, consultation, and education. The efforts directed toward the eradication of ophthalmia neonatorum have been, perhaps, the best publicized, but no less important are the activities planned to minimize the incidence of infectious diseases and the special programs for the control of tuberculosis and syphilis.

Causes of blindness have pointed the way to areas of prevention, and departments of health have begun to recognize and assume the responsibility for providing expert professional help through direction and consultation. Great strides have been made in the extension of the work of a health department by the development of county health units. County health officers and public health

\* Presented at National Conference of Social Work, Atlantic City, N. J., June 2, 1941.

† Director of Social Service, New York Hospital.

nurses working in and out from these centers have been able to make direct application of preventive measures. Educational programs can be brought directly to the people for whom they were designed, and advice in nutrition and child care and attention to the needs of the preschool child have all contributed to saving the sight of children. Just how much this coverage means is thoroughly appreciated only by those workers who have been frustrated by its absence. It is one of the anomalies of our democracy that geographical location so frequently determines whether an individual can have the services supposedly offered to all of us.

Not under the health department of all the states, but in a large number of them, are the Crippled Children's Services which have been defined broadly enough to include, in many states, some eye conditions which lead to blindness. Diagnoses of congenital cataracts and other conditions likely to need surgical help are most commonly accepted, and it is encouraging to find that squint and trachoma are also included in some instances. This service means that medical and surgical treatment is arranged for, that glasses are provided, and that attention is paid to those aspects of after-care which must be considered, if treatment is to be complete and successful. These include special educational arrangements, when necessary, vocational guidance, and help with problems brought about by the emotional factors which frequently affect the child and his family relationships, and which are inherent in any handicapping condition.

#### **Departments of Welfare**

A department of welfare has many opportunities, both on the state and local level, to participate in a concerted effort to save sight in childhood. Its major responsibility is planning and caring for those in need of public assistance and, as a corollary, the further responsibility of analyzing the causes which lead to a need for public assistance and for finding out what can be done to eliminate those causes. Blindness is one of the reasons why people are dependent, and a division for care of the blind in a department of welfare should be concerned with prevention as well as relief. Too often, however, the individual who comes to the attention of the division for the blind is beyond the stage where sight can be saved,



so that one expects the case worker in other sections of a department of welfare to be even more concerned with eye health in the families under her care. The provision for more and better opportunities for the care of children brought about by the establishment of state child welfare services, under the Social Security Act, has added another avenue of approach to saving sight. Under the provisions of the Act, child welfare services are concerned with the care of dependent children, not only in their own homes but in institutions. Lack of a well co-ordinated program with trained workers to carry it out has put many a visually handicapped child into the darkness of a school for the blind or shunted him into a county home, from which he may now be brought out into some measure of sunlight. The problem must be understood by the administrators, the supervisors, and the case workers. The county welfare worker, whether she be concerned with general relief, child welfare services, blind assistance, or old age, must agree with Hippocrates that it is necessary to have "a knowledge of the whole of things." Those of us who know Miss Bailey in action, or only through what she says in the *Survey*, are equally impressed with the way in which she does a most difficult task.

#### Department of Education

In any program which concerns children, the department of education must play an important part, and like the other departments mentioned, it should provide service, consultation, and instruction. The school is a source of case-finding second to none, and an annual medical inspection with an eye examination by an ophthalmologist will uncover difficulties usually at the time when most can be done to remedy them. The school nurse is the means of interpreting recommendations to the parents and following to see that necessary treatment is given. Sight-saving classes are accepted as the best method of educating visually handicapped children, and in localities not large enough to have separate classes, certain equipment can be provided and helpful advice given by a special consultant in the state department of education. The provision of clear-type books, for instance, is as much a form of eye treatment as medication or surgery. Vocational guidance and trade training are within the function of the department of education and, in the latter case,



it is worth while to mention the importance of teaching by the use of good tools and up-to-date machinery and with insistence on safety devices. A department of education not only supervises the teaching of children, but it provides normal schools for future teachers. Here is a splendid chance to add instruction in eye hygiene and a knowledge of common eye defects and their significance, to the customary teacher preparation.

### **Other Agencies**

Other public departments have a stake in the prevention of blindness; specifically, the department of labor and the department of agriculture. Farmers, like domestic workers, are usually outside the provisions of Compensation Laws, and there are both industrial and agricultural operations which are perilous to eyesight. In the field of voluntary organizations, the agencies are many and varied. They may be primarily educational, research or program planning, like the national and state societies for the prevention of blindness, the Federations of Women's Clubs or Parent-Teacher Associations, or professional organizations like the State or County Medical Societies, Public Health Nurse and Social Work Associations, or they may give direct service like hospitals and clinics or Children's Aid Societies. In each instance, they must all be considered as constituent parts of a complete program for saving sight which is to be formed through integration.

### **Basic Pattern for Integration**

It would greatly simplify my task if I could present to you a neat blue-print of how these different agencies, both public and voluntary, might work together so closely that all children would be surrounded by every factor that safeguards sight. On the other hand, the fact that no completely comprehensive plan has been worked out is one of the reasons that I have the temerity to discuss the subject with you. If a model plan were presented, there would be many cries of, "This will not work. My state or my county is different," and that is not only true but is perhaps one of the reasons why we are still a democracy. However, I should like to borrow a phrase from the fashion magazines which have recently popularized what they call a "basic" dress, a severely plain affair

to which each wearer may add accessories to suit her own style and taste. There is, it seems to me, a basic pattern for integration both on the horizontal and the vertical plane to which may be added certain procedures necessitated by the peculiar organizational structure of each state or smaller locality.

In discussing the ingredients of integration, I mention those in the public field on the state or local level because they are the ones in which we are most involved, but in working out methods of integration, we must certainly begin with the federal program because there the organization is not only definite, but it is now in operation. Immediately after the passage of the Social Security Act in August, 1935, the Interdepartmental Committee to Co-ordinate Health and Welfare Activities was created by executive order, with the duties of studying health and welfare activities of Federal agencies, of making recommendations, and of co-ordinating the programs of Federal agencies in these fields. The duties of the Interdepartmental Committee were amplified in a later order from the President as follows:\*

"It shall be the duty of the Committee (1) to continue to sponsor appropriate co-operative working agreements among the various agencies of the Government in the health and welfare field, and to continue the work under agreements already in effect; and (2) to study and make recommendations concerning specific aspects of the health and welfare activities of the Government, working toward a more nearly complete co-ordination of the activities of the Government in these fields."

This, then, is integration at the very top and operating upon a horizontal plane. The system of consultant services, carried on by specialists attached to the federal departments who are available for help and advice in respect to state plans, is vertical integration and is equally necessary to achieve an adequate program. The prime necessity for efficient co-operation is that each department or agency should be perfectly clear as to its own function and should proceed from that point to a thorough understanding of the functions of the other departments with which it is to collaborate. Integration of services for the purpose of saving sight does not mean

\* Executive Order of October 27, 1936.

taking away activities from any agency and setting up one whose exclusive duty is that of prevention of blindness. It means the lively perception of where, within the scope of each agency, children may be considered as whole beings, with the scrutiny of their eyesight as part of that whole. It means the establishment of working agreements and procedures which grow out of a realistic knowledge of what facilities exist and what resources can and should be developed.

States may well borrow from the organization of the federal departments and form interdepartmental councils with representatives from all the public departments which concern themselves with children—health, welfare, and education, with perhaps labor and agriculture, and associate membership from such voluntary organizations as have been mentioned earlier. One word of warning is needed, however, because this is one of those organization plans which frequently looks far more effective on paper than it is in actuality, and certainly, if used alone, would not accomplish the desired goal of integration. For one thing, this type of council is likely to be composed of administrative heads who are removed from the problems of the person who is functioning in the field. It should be complemented by another committee which also cuts across department boundaries and which has on it, for instance, representatives from the supervising staff of the public health nurses in the department of health, of the case workers in the welfare department, and the visiting teachers or school nurses from the department of education, as well as members from the organized voluntary health and welfare services. Here is one of the places where the medical social worker especially trained in eye work can make a special contribution. We should work toward having such a special consultant in each department, but she is perhaps, at present, more frequently found in the division for the blind or connected with the health department or on the staff of a state or voluntary hospital. Whatever her position, she is quick to see the strategic points where service or education may be improved or strengthened, and she can bring real content to the working agreements of the co-operating departments. The ideal organization would include not only a medical social consultant with special knowledge of eye patients but a nursing supervisor within the bu-

reau of public health nursing who advises the nursing staff. These two would serve in a similar capacity to the special supervisor functioning in the department of education.

With these two interdepartmental committees working simultaneously and interchanging the results of their work, and with the local workers who meet on the day-to-day job, testing and improving co-operative procedures, an excellent foundation for horizontal integration will be laid.

External factors, which in themselves seem relatively unimportant, frequently complicate the best of plans. Geographical separation of the various offices of state departments is often a very real obstacle. The capital in which one might expect all the offices to be located is, in many states, not the city most accessible nor most highly organized in resources. This means that interdepartmental planning must be carried on by correspondence or by infrequent conferences involving considerable travel time and expense. For instance, in one state the offices of the Department of Education, the Department of Welfare, and Division of Child Welfare and for the Blind are nearly 100 miles from the joint office of the state consulting ophthalmologist, the medical social consultant, and from the hospital where much treatment is carried out, and the State School for the Blind. Two hundred miles farther off is the State Crippled Children's Commission, which is responsible for the treatment of congenital cataracts. With all the best intentions in the world, and with a plan which is carefully worked out and looks very well on paper, the odds here are against developing truly integrated procedures.

The same difficulty often exists within a department when those in the field are at some distance from the administrative offices. In this respect, I might suggest that distance is often psychological as well as geographical. It is here that the value of the medical social worker and the public health nurse who have both had special training in eye work is most clearly seen. Obviously, they can not give case work service or public health instruction to all the children under care, but they can consult with the local case worker or nurse and make sure that conditions are understood and recommendations interpreted so that nothing is overlooked that might help to save sight.

Situations that call for just this service are vividly stated by one medical social worker in discussing her function as an interpreter. "How can the social worker in a distant county or parish dispel fears, clear up certain doubts, explain why an operation is advisable or even imperative, if her knowledge is limited? We do not want to coerce our clients nor do we have the right to do so; yet do we want them to choose to neglect their eyes and refuse a chance of restoring or improving vision? The case worker should be the one to help the client at such times. She knows him more intimately, is familiar with his environment, and she should understand his hesitancy in accepting recommendations."\*

A program for the control of trachoma soon to be established in one of the states illustrates several valuable points in both vertical and horizontal integration. The unit is operated by the department of health and its members are an ophthalmologist, a public health nurse, a medical social worker, a clerk and a truck driver, the last because it is a mobile clinic which moves by trailer. The service provided is significant not only because it combats blindness by the treatment of trachoma but because it offers education to those who are working with children, in whatever field. The ophthalmologist makes an examination to determine what is the matter with the children brought to him with eye symptoms and recommends what treatment should be sought if a condition other than trachoma is found. Such consultant service benefits not only the patient but the practicing physician who is, unfortunately, not always aware of the significance of eye troubles. Contacts are made by the public health nurse with the local health units and collateral treatments such as antiluetic care or special attention to nutritional problems are arranged. The medical social worker plans adjustments with the school, made necessary by the eye disease found, or works with public or voluntary social agencies on problems which arise. Each of these members of the unit is in a strategic position to further the understanding of others who have an interest in seeing that the sight of children is safeguarded. Because this particular unit is supported partially through federal funds, advice is available from the public health nurse and medical social work regional con-

\* Harrison, Anna M., "Possibilities of Restoration of Sight and Prevention of Blindness in the Aid to the Blind Program," *Sight-Saving Review*, September, 1940, p. 184.

sultants of the Children's Bureau, so the line of integration here goes straight from the top to the bottom.

Programs in an agency are first laid out in broad general lines but their application in social case work is to individuals. The case worker is concerned with saving sight in children, not because it is an economically sound thing to do but because it will help to assure each child under her care the chance to live a fuller and more satisfying life. She knows that any handicap which hinders this development has potentialities for harm to the individual and to society. Her concern must be founded on an understanding of what visual defect may mean to a child and why its consequences are not alone impaired efficiency but inner conflicts which may be manifest by preoccupation with self; by inability to face and accept responsibility; or by irritability or timidity. Her aim must be to help the child meet his particular problem by using the services available for him in the way that will best meet his need. For instance, it is not enough to "arrange" admission to a sight-saving class, it is necessary to know whether he and his family are able at the time to profit by such service. For example:

A mother brought her nine year old boy to a pediatric clinic, complaining that he was sickly and irritable and insisting that she was greatly worried over him. He was found to be under-nourished and timid and it was most difficult to make friends with him. He was referred to the medical social worker for a social study. She learned that the mother had been greatly disappointed that her child had not been a girl and had kept him in curls until he went to school and had prolonged his baby interest in dolls. Her over-protection was so intense that he had never been allowed to play with other boys and had been taunted by them as a "sissy." He was sensitive about his "difference" and resorted to irritable and demanding behavior at home. Besides his poor general physical condition, he was found to have decidedly defective vision and admission to a sight-saving class was recommended by the ophthalmologist. The medical social worker's understanding of the whole situation made her believe that this was not the time to add to the boy's feeling of difference by sending him to a special class. She realized the overwhelming desire of all children to belong and to conform, whether it is by playing the same games or by wearing the same kind of clothes. The ophthalmologist was

much interested in this analysis of the family situation, and suggested that temporary arrangements be made with the teacher for the remainder of the school year—about two months—so that the boy need not be called upon to do work that demanded close use of his eyes. His mother was brought to realize something of her part in her son's development and agreed to let him spend the summer at a boy's camp. There he began to learn to play with others and to accept the give-and-take of healthy competition. When he returned to school in the fall, he was able to take the referral to the sight-saving class in his stride. His sight will be saved but not at the expense of his personality adjustment. Services were integrated with full comprehension of emotional as well as physical needs.

I hope that all of you had in your childhood, as I had, a kaleidoscope. Those pieces of gaily colored glass fascinated me as, with a slight turn of the wrist, I caused them to fall into a dazzling but orderly pattern. At each turn, the same pieces of glass were used but the pattern was markedly different, although the resulting picture was always just as enchanting. Is not this toy analogous to the topic of integration we have been discussing? The constituent parts of a program for saving sight are all there and should all be brought into play, but the pattern of care provided for each child in conserving his sight will be different because those services are used which best meet his individual need. Integration is used to the end that he may have the fullest complement of sight possible as part of his equipment for life.



## Children's Eyes

Willis S. Knighton, M.D.

DISCUSSES the development of the eye, the refractive errors, binocular vision, and eye diseases and injuries in childhood.

**C**HILDREN'S eyes are not adult eyes. Although the eye, like the brain, is precocious in its development, it does not reach its full size until about the age of 10. Thereafter it undergoes natural changes, such as toughening of the sclera (outer coat, commonly called the white of the eye), with loss of elasticity, and packing down of the innermost lens fibers. (The lens continues to grow throughout life.) Even after the eye has reached its full growth, there are structural changes in the orbit which modify the action of the muscles that move the eye, so, for practical purposes, it would seem fair to say that the eye does not settle down to adult life until the rest of the body has matured, at 16-21 years of age.

### Development of the Eye

Functional development of the eyes is partly a matter of education. Heredity, of course, plays an important part because it determines the capacity to improve.

Lid reflexes to light are present during the first ten minutes of life, but fixation movements (trying to follow a light) are not definitely established for ten days. The macula (area of sharpest vision which enables one to perceive detail) itself is not fully developed for six months.

The question of vision in early childhood is not easy to evaluate, because it must consider such psychological factors as attention and interpretation, as well as the physical ability to hold the eyes fixed upon the reading chart and to see clearly. It is doubted whether the child is physically able to read 20/20 until the age of 5.

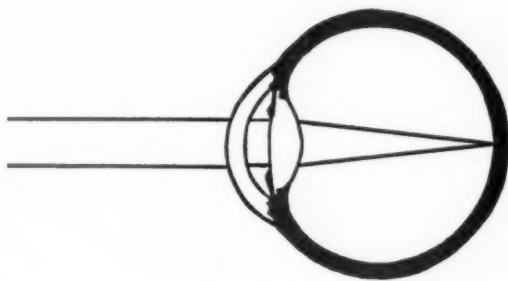
Thereafter his visual education progresses rapidly. Once he has



started his three R's, he is confronted with the necessity for good visual acuity, proper co-ordination of the two eyes and stereoscopic vision (binocular perception of depth).

A routine school test should be regarded as only a preliminary report of visual acuity and in no way as an examination of the eyes. The ability to read 20/20 is no criterion of the function of the eyes, as we shall see, and unless the test is understood, erroneous conclusions may be drawn.

The term "20/20" is an arbitrary standard of normal vision. The size of the letters or test symbols is designed so that an eye with normal vision can interpret them at 20 feet. Since the test is supposed to be conducted at 20 feet, the other lines are designated as 20/30, 20/50, 20/100, etc. If the patient at 20 feet can read only



NORMAL EYE

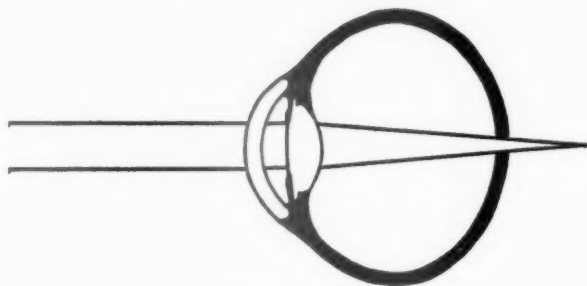
the 20/40 line, for example, his visual acuity is reduced, because he should be able to read that line at 40 feet! Similarly the 20/100 line should be legible at 100 feet, etc. Don't make the mistake of saying that 20/40 vision is 50 per cent normal—20/40 is not a real fraction and is written that way only for convenience. As a matter of fact, 20/40 is nearer 80 per cent normal.

Normal visual acuity and normal refraction must be differentiated. Normal visual acuity simply denotes the ability to read the 20/20 line, regardless of refractive error, eyestrain, etc. Normal refraction, called emmetropia, means that the optical system of the eye is correct so that distant images are focused on the retina without any strain. The visual acuity may be reduced by retinal disease, even when the refraction is emmetropic.

Distant vision—20 feet—is the standard for refractive tests. Closer work requires focusing by the action of the ciliary muscle on the lens inside the eye—called the act of accommodation. The emmetropic eye can see distant objects clearly—20 feet or more—without any strain or accommodation. Closer work requires a normal amount of accommodation.

### Refractive Errors in Childhood

In *hyperopia*, or “far-sightedness,” the eye must accommodate even for distant vision. The emmetropic eye can see just as far and just as clearly as the hyperopic eye, but while the emmetropic eye is relaxed, the hyperopic eye has to accommodate or strain. The



HYPEROPIC EYE

more hyperopic it is, the more it has to strain, so the term “far-sightedness” seems inappropriate. Close work entails additional accommodation, with the result that the hyperope must always use his accommodation more than the emmetrope. This extra use of the accommodation, which is directly proportional to the amount of hyperopia, causes all of the symptoms, from eye-fatigue through strain, congestion, blurring and headache to interference with the co-ordination of the two eyes and general systemic disturbances.

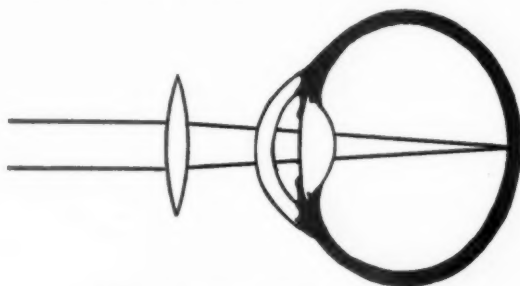
Small amounts of hyperopia are easily taken care of by the average child, because he has a great deal of accommodative reserve; it is only in the higher amounts, when the accommodation is being taxed, that the symptoms appear. The amount of strain can be determined accurately only by an examination which re-

laxes the accommodation with medicine and thereby discovers the total hyperopia.

When the amount is appreciable, the hyperope will tend to avoid close work as much as possible. Thus the boy in school will prefer looking out of the window to studying. On the other hand, he will probably be good at outdoor games.

All the symptoms of hyperopia are corrected by glasses which do some of the focusing and relieve accommodation. The glasses will have to be worn for close work or all of the time, depending upon the findings in each case.

In *myopia*, or "nearsightedness," the child cannot see clearly in the distance, but he can and does enjoy close work. As a result, he becomes a bookworm, with excellent marks in school, but his lack



HYPEROPIC EYE CORRECTED BY LENS

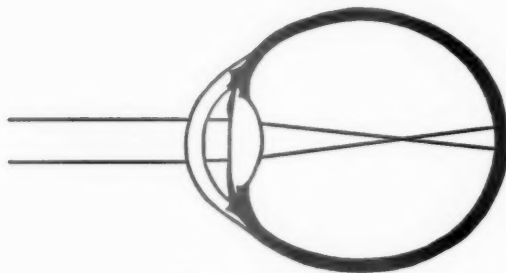
of interest in out-of-door activities doesn't make him popular with his schoolmates.

Distant objects focus in front of the retina because the eyeball is usually longer than normal; in order to get the focus back to the retina, the object must be closer than 20 feet. The greater the amount of myopia, the closer the object must be held to see it clearly.

Small amounts of myopia are considered physiological. They do not progress to any appreciable extent and they are not accompanied by pathological changes within the eye. Distant vision is slightly blurred, but the child may not notice that because he can make things clearer by squeezing his lids together. Glasses will correct him perfectly.

Malignant or "progressive" myopia, which fortunately is quite rare, gets worse, as the name implies, and no means of arresting it is known, unless a concurrent infection is discovered and remedied. Present opinion leans toward the theory that malignant myopia is the result of a low grade inflammation like uveitis. It is accompanied by stretching and tearing inside the eyeball, and in the last stages there is degeneration of the eyeball, with detachment of the retina and dislocation of the lens. During the early stages the vision gets progressively worse, even with glasses.

The exact cause is not known, but a lack of resistance in the eyeball itself is fundamental. Little hope can be held out for a case of this kind, but when it is recognized early, the patient and



MYOPIC EYE

his family can be prepared so that his future course can be planned accordingly.

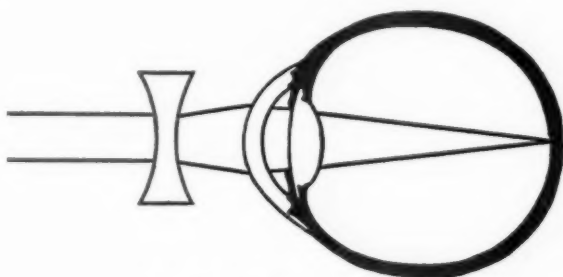
In between these two extremes lies the average type of myopia, which continues to progress up to a certain point and then slows down or stops altogether. Its most rapid progress is usually between the ages of 8 and 16 years, and in that period the proper care of the eyes can modify the final outcome to a great extent.

The myope can see close work clearly without accommodating, so his eyes do not get the proper amount of accommodation activity that nature intended. He should wear his correcting glasses *constantly* if his eyes are to act normally and to see clearly. Close work should be limited to sensible proportions, and always under optimum conditions of illumination. The reading type should always be clear so that there will be no temptation to hold

the work too close. Since the myopic eye is physically weak, it should be aided by especial attention to the general rules of health.

In every case of myopia the refraction should be done under a cycloplegic, to insure complete relaxation of accommodation during the test and to find the total error. Periodic examinations are necessary to determine the progress of the disease.

The normal eye at birth is short and the lens is round. This gives a preponderance of hyperopia in infants, but as growth proceeds, the eyeball lengthens and the lens flattens out and the hyperopia decreases. If the initial hyperopia is low, it often ends up as a low degree of myopia. For this reason, a fair amount of "hyperopic reserve" in infants is desirable.



MYOPIC EYE CORRECTED BY LENS

In *astigmatism*, because the eyeballs are not quite symmetrical, everything appears somewhat distorted. The child may not be conscious of this when the amount of astigmatism is small, and he may even be able to make out the 20/20 line, but his accommodation is automatically trying to clear up the image. This it cannot do—for anatomical and physiological reasons—but it continues to try, nevertheless. In addition to the eyestrain thus imposed, there is a general nervous strain, varying in its manifestations from "nervousness" to actual nausea, vomiting and convulsions, according to the amount of astigmatism.

Myopia or hyperopia may exist in conjunction with astigmatism and add its own symptoms. Nothing but glasses can correct astigmatism, but when these are worn, the symptoms disappear like magic. Careful refraction will determine whether glasses are necessary.

In general it may be said that symptoms from any of the refractive errors can be relieved only by the wearing of glasses. Some relief is often obtained just by the correction of bad reading habits, but the attempt to do away with glasses by giving exercises which stimulate a tired muscle can accomplish no permanent good.

### Binocular Vision

The highest function of the two eyes is stereoscopic vision, the ability to appreciate depth or three dimensions. It is a mental concept entirely and depends upon (1) good visual acuity in each eye, (2) perfect co-ordination so that the two eyes see the object simultaneously at any distance, and (3) cerebral fusion into one image. Only then can true stereopsis take place.

The modern treatment of cross-eye, or strabismus, is not satisfied until an attempt has been made to develop the full faculty of stereoscopic vision. Merely straightening the eyes may leave one eye "uneducated" so that it does not function with its fellow.

The problem of strabismus is quite complex. Suffice it to say that no two cases are exactly alike and similar management often gives widely different results. Because refractive errors may cause, or at least modify, the strabismus, each case should be carefully refracted under a cycloplegic (a drug used to put the accommodation temporarily at rest). In conjunction with exercises to re-educate the individual to use his two eyes together (binocular vision), proper glasses are often sufficient to straighten the eyes. At other times they have no effect and operation is necessary. (The choice of operation itself is often difficult.) Sometimes all three procedures are necessary, and none of them should be condemned because of known failures.

Since binocular vision is a late acquisition it is easily lost if defects in its functioning are neglected too long. Every case of manifest strabismus, whether convergent or divergent, should be cared for *as soon as possible*, otherwise the child will learn to suppress the image in the deviating eye, to avoid diplopia (double vision). Later treatment may be unable to restore the vision that has been suppressed, and it remains poor from disuse—amblyopia exanopsia.

There is a large class of patients with heterophoria, i.e., a tend-

ency for the eyes to deviate from normal co-ordination. In these cases there are symptoms of eye fatigue while the brain tries to maintain fusion against the imbalance of the muscles. Occasionally, when the patient is tired, the fusion sense cannot overcome the imbalance, and one eye breaks away, giving double vision and the appearance of a "cast." The condition is then a manifest strabismus, spoken of as a "tropia." Fusion demands may again overcome the heterophoria, always with a feeling of fatigue, or the deviation may remain permanent.

*Esophoria* is a tendency to converge, *esotropia* is a manifest convergence. Exophoria and exotropia refer to divergence, hyperphoria and hypertropia refer to upward rotation.

The "tropias" are easy to detect in children, but the "phorias" can be discovered only by testing of the muscle balance. Refraction and exercises under proper direction often suffice to relieve heterophoria, although operation may be advisable in high degrees of imbalance, especially in adults.

### Eye Diseases in Childhood

The problem of eye diseases in children resolves itself into two main considerations: the conservation of vision and the prevention of disease.

The conservation of vision is mentioned first only because it must take into account those hereditary and congenital cases that enter into this vale of tears with defective eyes or vision or both. Preventive medicine will always play a small rôle in combatting inherited defects, until nature's laws are better understood and eugenic standards are raised. The main problem is to educate the patient in the use of what little vision was given him, so that he will be able to enjoy some of the luxuries of seeing, and to teach him how to avoid overtaxing his limited visual strength. In the majority of cases, little more can be done and it is cruel to raise false hopes. That, however, does not relieve us of the responsibility of always trying to lift the veil. If every case of interstitial keratitis, for example, were left untreated, many more children would be blind today. The disease is due to congenital syphilis and results in a clouding of the cornea with reduced vision, and distressing pain in any kind of light. Antisyphilitic treatment is not successful in



every case in clearing the cornea and relieving the photophobia, but the reward is obtained in the many cases that do respond and get relief. Congenital glaucoma, buphthalmos, is another instance that warrants interference. Here the filtration of the intraocular fluids is defective. Unless artificial filtration is provided by operation, the intraocular tension distends the eyeball (it is very elastic in children) and ultimately destroys the vision by pressure on the retinal nerves.

Retinitis pigmentosa is an early disease for which there is no known remedy, although many attempts have been made to relieve its effect on vision by medicine and surgery. It follows a definite hereditary pattern and results in poor vision, especially in dim light (night-blindness), getting progressively worse and often accompanied by cataract.

These and many other diseases, unfortunately, fall into the category where treatment seems to play a minor rôle and where sight conservation seems to offer the best help.

Acquired eye diseases can be prevented. All that is necessary is a knowledge of the cause and a sure cure for it. That's a pretty big order, but every year sees new methods of diagnosis and treatment that are working wonders.

Most external diseases of the eyes, lids, etc., come from the outside and can be laid to unhygienic conditions. Even in the most scrupulously clean homes, the child who spends most of his time on the floor rubs his eyes with dirty fingers.

Conjunctivitis is an inflammation of the membrane which forms the inside lining of the lids and also covers the front of the eyeball. When the eye becomes inflamed from any external irritant, like dirt, dust, wind, rubbing, etc., the layman calls it "pink-eye." (That is a dangerous term because the eye appears "pink" in many other diseases, including some that originate on the inside.) Conjunctivitis assumes different forms, flat and follicular, and may be accompanied by pus. Large follicles under the upper and lower lids are common in children and may require scraping before they disappear. The disease itself is not dangerous, but it is very annoying. It is infectious but not contagious, i.e., it can be transmitted by contact, on towels, handkerchiefs, etc., but not by mere association. Treatment is relatively simple and effective. By contrast,

trachoma, which resembles follicular conjunctivitis, is intractable—it scars the lids and impairs the vision by clouding the cornea. The danger of considering every inflamed eye as a “pink-eye” or a “cold in the eye” is obvious.

Other external diseases, like styes and inflamed lids, may respond readily to home treatment, because nature is kind, but it is wise to let the eye physician suggest the treatment that will help most.

Inflammation and disease of the cornea (keratitis) reduce the transparency of that tissue and impair vision. In general it may be said that keratitis which results from outside infection is easier to handle than when it occurs as the result of general disease, like tuberculosis, or follows another internal infection, like sinusitis.

Children are prone to a form of keratitis, sometimes associated with conjunctivitis, called phlyctenular keratitis. Tiny painful elevated spots appear on the cornea and conjunctiva and the eye appears “pink” because of the inflammation around the phlyctenules. Tuberculosis is thought to be a factor in the production of this disease and unhygienic living conditions seem to play a part.

Iritis is an inflammation of the iris, the colored part behind the cornea and in front of the lens. The causes of iritis are legion, from a nearby infection, like abscessed teeth, to a remote infection in almost any part of the body. The iritis itself is not noticeable until some special magnifying instrument is used, but it is usually accompanied by an inflammation that encircles the cornea on the *outside* of the eye—again a “pink” eye. The outside inflammation is not as marked as in many cases of conjunctivitis and for that reason may not seem important to the layman. It does suggest internal disease to the eye physician, but even to him it conveys no hint of the full extent of the damage. Iritis, cyclitis, and choroiditis often exist together or run from one into the other because the iris, ciliary body and choroid form a continuous lining called the uvea. Uveitis means an inflammation of all three.

The choroid is a vascular layer that lies under the retina and supplies some of its nourishment. Because of its close connection, any disease of the choroid can cause an inflammation of the retina, and when the retina is affected there is a proportionate loss of vision. Extensive disease can exist inside the eye without any external manifestation, and in the case of infants who cannot an-

nounce their poor vision, it may remain undiscovered for a long time. Even in older children, who are more articulate, the internal disease may be passed over in its early stages before it affects the vision *noticeably*. The obvious precaution is a routine eye examination, including inspection inside the eye.

All of these structures, from the lids to the retina, may become involved in those acute infectious and contagious diseases called "common childhood diseases." Toxins, viruses, and bacteria play a part directly and indirectly, and unless the pediatrician pays attention to the eyes of his patients, inflammation, paralysis, and death of eye tissue may occur.

Conjunctivitis is a common accompaniment and ranges in severity from a mild inflammation to a severe infection with pus and involvement of the cornea. The muscles that move the eyes are weakened or paralyzed in diseases like encephalitis, scarlet fever, and diphtheria. The upper respiratory infections may be accompanied by iritis and sudden blindness of one eye, and tularemia may cause optic atrophy.

Pediatricians are more "eye-conscious" today. Their small patients have a better chance of surviving the childhood diseases with healthy eyes because the doctor knows more about the prevention and treatment of the specific dangers to the eyes and doesn't rely on long periods of inactivity in a darkened room.

### Eye Injuries in Childhood

Any discussion of children's eyes would be remiss if it did not mention injuries, and yet it is difficult to know how much or how little to say. The average parent knows enough to see that children are kept away from sharp and cutting toys and from all situations that might prove dangerous. But when eye accidents do occur, his reaction is unpredictable. The safest treatment is to see an eye physician immediately. A blow on the eyeball may be painful without causing damage, or it may be severe enough to rupture something inside the eye without giving any outside evidence. The external appearance is no criterion of the damage done. Neither, unfortunately, is the amount of pain.

When something sharp has entered the eye, there is always the added danger of infection. Perhaps a word here about boric acid

will not be amiss. From time immemorial this solution has been considered a panacea for all eye diseases, and when the parent uses it in inflamed or sore eyes, he often feels that everything possible has been done. The unfortunate result is that much valuable time may be wasted in using this ineffectual "eye-wash" when something more specific should be done. Argyrol as a home remedy may be similarly condemned.

In addition to the danger of infection from penetrating wounds, there is always the possibility of sympathetic ophthalmia. This is a dread disease which destroys the *other* eye, unless prompt measures are taken. The disease is so treacherous that it may not make its appearance until the injured eye has apparently healed, and it has been known to wait as long as 40 years before attacking the other eye!

Home remedies have no place in the treatment of eyes. Competent care and treatment can preserve good vision.

## Industry's Responsibility in the Conservation of Sight\*

Charles F. Kutscher, M.D.

AS a consulting ophthalmologist for a large steel corporation, the author presents his experiences in trying to solve the problems of eye accidents in industry.

THE old proverb, "An ounce of prevention is worth a pound of cure," carries real significance in eye injuries. In view of this, our efforts should constantly be spent in devising new preventive methods, as well as continued education in the proper use of the available safety devices.

The eye is one of the few organs of the body that nature has so richly endowed with protective devices. The ball itself rests within a pyramid of bone, the apex directed posteriorly, the base forward. The ball is cushioned from this bony framework by soft tissue composed chiefly of muscle and fat. The force of a blunt object striking the eyeball is rendered less damaging by being transmitted in part to these soft tissues. A sort of shock absorber for the eyeball is set up by this anatomical arrangement. The lids form the protection for the front of the ball and they are so constructed that in case of danger they can be promptly and effectively closed—all automatic, so to speak. Foreign bodies, ever so lightly touching the eyelashes, produce an immediate closure of the lids. Many cases of third degree burns of both upper and lower lid without the slightest damage to the ball offer mute testimony as to the effectiveness of the reflex closure of the lids. If an imaginary straight line is drawn from the center of the eyebrow to the upper part of the cheek, the front of the eyeball will be found to lie just behind this line. Because of this, very large objects striking the face miss the

\* Presented at the National Conference of Social Work, June 5, 1941.

eyeball. The eyeball itself has a very dense, tough covering, which is not too easily penetrated. We see many scleras partially penetrated by foreign bodies which would have completely penetrated a less dense membrane.

The first fundamental in the visual act is that light can be freely transmitted to the retina. In order to fulfill this physical fact, nature is unable to install, within the eyeball, measures she usually uses for defense. There is no blood vessel network occupying the hollow of the eyeball. Obviously blood vessels, with their rich supply of immune bodies and the reconstruction building blocks, could immeasurably aid the injured eye, and by being immediately available, lessen the length of convalescence. If, however, these vessels were present, they would impinge the incident light prohibiting its access to the retina. Many accidents which would be mere trifles to other organs are major catastrophes to the eye.

A close scrutiny of the defenses which a beneficent nature has bestowed upon the eye indicates a supreme desire on her part that no injury be inflicted upon this organ.

With the increasing complexity of the industrial machine there is an ever-expanding risk of eye injury. By far the greater number of eye injuries are caused by foreign bodies on the surface of the eyeball or imbedded in the cornea. The major portion of the remaining accidents fall under one or more of the following causes: (1) burns of eyes, chemical or thermal; (2) contusions of ball; (3) rupture of eyeball; (4) intra-ocular foreign bodies; and (5) radiant energy. A word of warning bears stating at this time: *i.e.*, after many types of eye injury there is a latent period from the time of accident until the development of symptoms, such as pain, headaches, or visual disturbance. This latent period may occupy a few hours or a day or so. The withholding of treatment until the development of symptoms may mean the loss of an eye that could have been saved had treatment been instituted early. Wounds of the eyeball open the portals for the entrance of disease-producing germs frequently present on the surface of the ball. Badly managed or delayed treatment gives these organisms a chance to gain a foothold which may be the decisive factor in the battle to save the eye. Without boring you with the medical reasons why, suffice it to say that the convalescence from many eye injuries occupies

months, many of them being borne with pain. Only those who have suffered pain in the eye can appreciate its intensity and its seemingly age-long character. The pain of a sore hand can often be alleviated by holding it or by putting slight pressure on it. These pain-relieving devices cannot be of aid to a suffering eye.

Since many injured eyes are doomed from the moment of inception, it behooves all of us—in industry as well as out—to use a little caution in the discharge of our daily duties and pleasures. We see in our private practice many eyes injured beyond all hope of repair often resulting from some thoughtless action. An example—the careless handling of household ammonia, lye, and caustic soda may result in a painful eye injury which may terminate in blindness.

Industry has many reasons for protecting her employees against injury. The reasons are human as well as selfish. The blind receive almost universal sympathy, and it is not conceivable that any one would be negligent in supplying the means to protect an eye against injury. There are many important key jobs in industry that have cost the employer large sums of money in preparing a particular man for a particular job. Eye injury may temporarily or permanently prevent the man from fulfilling his job, causing an interruption in the normal flow of work. In these competitive times any lags in the production schedules are costly. Following a serious eye or general accident, a marked decrease in the efficiency of fellow workers may be noted. This may slow up production for a day or so. Prevention of the cause of this perfectly normal reaction materially cuts down operating costs—a situation all employers are interested in. The compensation laws are such that eye injuries are, and rightly so, expensive injuries.

The course pursued by industry in the prevention of eye accidents follows a very simple but intelligent course, and includes the following steps:

1. Removal of all possible hazards
2. The wearing of appropriate goggles
3. The constant education of the employee concerning the likelihood of eye injury
4. Constant supervision to make sure that the employee is following his safety regulations
5. Promptness in the reporting of eye accidents



By following this simple routine countless thousands of eyes have been saved and by prompt institution of treatment the duration of illness has been greatly decreased.

The removal of all possible hazards forms the first link in the chain of defense. To accomplish the desired result it is necessary that employees maintain their machines and equipment in proper working order. Many an eye has been injured by being struck by a missile from the machine itself. Fractured members of a machine are often sent through the air at enormous speed. The abundant use of safety guards around moving parts has been quite helpful in prevention of injuries. The following case history will help to illustrate the danger of broken machinery being kept in use:

A man operating a large valve broke the metal ring joining the spokes of the handle of the valve. He continued operating the valve, using the spokes to open and close the valve. One day he slipped and the sharp end of the spoke gouged out his eye. If the rim of the valve had been intact, the accident could not have happened.

Cases have been treated where employees have tripped over equipment that had carelessly been left in aisle ways. In falling, the eye has struck some projection, producing a rupture of the eyeball. The proper illumination of industrial buildings has removed a frequent cause of accident—dark hallways and stairways where employees are unable to see sufficiently well to “watch their step.”

Perhaps no single procedure has done as much to prevent industrial accidents as has the wearing of safety goggles. Untold thousands of eyes have been spared by their use. The savings to the employer run into millions of dollars since the advent of their use. At present they can be supplied to prevent almost any type of injury. To prevent the damage done by flying particles heavy lenses of large diameter are available. These lenses, by a method of heat treatment, are capable of standing up against enormous impacts without breaking. While it may be true that an occasional eye is lost by being badly cut by flying fragments of glass if the lens is broken, yet the number of eyes saved is so large as to make the number lost seem insignificant by comparison.

Moreover, particles striking the goggle with sufficient force to break the lens would most assuredly destroy the eye.

To individuals exposed to infrared or ultraviolet light, lenses containing appropriate pigment give 100 per cent protection against these harmful radiations. It must be remembered that when the source of these rays is intensified, a darker shade of lens must be used. In certain industries, caustic chemicals existing as finely divided powder suspended in the air is a serious threat to the well-being of the eye. To avoid this hazard dust-proof goggles are being supplied which are effective barriers against the dust causing damage to the eyes.

"Familiarity breeds contempt" applies to all of us at times. Men constantly engaged in dangerous pursuits often grow careless of the possibility of accident. They feel that it won't happen to them. The safety engineer has constantly to preach to these individuals to keep them accident-conscious at all times. Much instruction is given by the safety department on how to avoid accidents. They have been as helpful to high production levels as any group of officers in a plant. By their relentless effort the lost time accident rate has been materially reduced. Lost time is expensive in that a change of operating personnel results. The loss from this alone may be much greater than the medical costs involved in treating the injured eye.

It may seem strange to some of you that constant supervision by our safety engineers is necessary. One would think that, after instruction concerning a possible hazard, an employee would be faithful in using all possible safeguards to protect his eyes. Unfortunately, that is not so. Frequently during inspection trips you will suddenly come upon an employee wearing his goggles on his forehead. On being questioned, all sorts of alibis will be issued. Even suspending the offender from work for a few days has not stopped the practice. Object lessons such as seeing his buddy lose an eye under similar circumstances may not be sufficient instruction. Men exposed to ultraviolet radiation are faithful in following regulations concerning goggles because they are aware of the severe eye pain that follows exposure to these rays.

Goggles are of necessity uncomfortable, being constructed of heavy, durable materials with very thick lenses. Light weight

construction would fail in performing the very duty for which they were developed. They must be heavy and strong to offer the needed protection. Because of the weight they become uncomfortable after prolonged use. This discomfort can be greatly lessened by having goggles fitted to each employee rather than just hanging them on his face.

In former times, when an employee got a foreign body in his eye, he would seek the professional service of his fellow workmen. Many a dirty hand, holding a pocket penknife, has guided a foreign body out of the eye. Each plant would have one or more employees who acquired considerable reputation among their fellow workmen for their dexterity in treating injured eyes. Obviously such unsterile techniques resulted in infection, causing the loss of many eyes. It took considerable education and regulation by management to put an end to such vicious practices. In industry today a serious offense is committed when an employee fails to immediately report an accident. This rule alone has saved many eyes, as well as other members of the body.

Following injury to the eyes, management generally lends an especially sympathetic ear. If at all possible the employee is put back to work. The character of the work done prior to injury and the visual acuity after healing are the deciding factors in the rehabilitation program set up for the case at hand. The habits and personality of the employee also must be considered in finding a new job in the plant.

Quite naturally an injury extensive enough to render an employee blind also renders him unfit for further employment in the average plant. Many jobs can be obtained for those individuals whose vision is 20/50 in the better seeing eye. Certain machines that are slow operating and can be adequately surrounded by safety devices can be operated by these unfortunates. Many with vision of even 20/70 in each eye operate slow moving lathes. This is a dangerous practice, except in certain very special cases. Janitor or general labor service in those parts of the plant where the rapid movement of equipment or material is not taking place can be effectively carried out by those with poor vision. The operating of open hearth doors can be as adequately carried out by a man with 20/70 vision as by a man whose vision is normal.

While each case is a law unto its own, it is the opinion of the author that, in general, certain points if borne in mind will help in finding the type of work that can be safely carried out.

1. Protect the eyesight that is left by wearing rimmed spectacles or safety goggles if the slightest hazard exists.
2. The quieter environments in the plant give the employee the distinct advantage of using his hearing as an aid in protection against further accident.
3. Avoid those areas of the plants where equipment or material is in rapid motion.
4. Those areas of the plant where pieces of equipment or goods must of necessity be lying about in an apparently disorderly fashion are danger zones.
5. Machine shops where flying chips from lathes, grinders, and planers are flying about should be completely avoided.
6. Locations where explosions might occur, such as pouring platforms and the like, necessitating rapid removal of one's self from the locale, is certainly not the place for one whose vision is materially reduced. Remember, in general, one with reduced vision also has slow vision. He has to study the image longer.

In closing, I should like to repeat what I said at first; in eye injuries, "An ounce of prevention is worth a pound of cure."

## The Forum

THIS section is reserved for brief or informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request.

### I Live in a Sighted World

In writing this paper my only qualification is that I myself fall under the general category of the visually handicapped, and have had the educational experience provided by the sight-saving program, and I know something of the experience and problems of other partially sighted persons. In other words, I write merely as a representative. Perhaps the first questions any one would be asked are, "What is it like?", "How does the world look to you?" Answers to these questions, perhaps surprisingly, would be basically the same as the answers to any questions involving human experience, and yet they would be as varied as the individuals giving them.

As we have often been told, there is no psychology of the partially seeing—there are only certain deviations or patterns that are char-

acteristic of them as a group. I can probably best illustrate this by drawing from my own experience.

The most obvious thing, of course, is the reduction of vision. To me, the world, which is like a photograph to most people, appears hazy and more like some medieval painting. Strangely enough the person does not always recognize his disability and this leads to many emotional problems. For example, the wearing of glasses may so increase the vividness and clearness of vision that the partially sighted person may very easily think he has quite normal sight. This experience has happened to me and was re-enforced by a natural desire to identify myself with the sighted. As a result, I interpreted my inability to do things calling for normal vision as a mark of inferiority.

The insecurity one feels in facing the unknown darkness around him

increases the natural tendency to depend on others, and this, I believe, is one of the fundamental problems of those with limited sight. Parents or uninformed teachers are very likely to take an emotional attitude and increase the individual's dependence by doing everything for him. The gap between him and his normally sighted companions is also increased by the little habits and mannerisms he is likely to develop.

The problem of social relationships is, of course, not so acute with the partially sighted as it is with those who are hard of hearing. My own experience has probably presented more problems of social adjustment than most others. A simple thing like my failure to recognize people and my refusal to admit the source of this difficulty has given me many periods of lonely isolation, particularly in the high school period. I have found it very important (and know that others share my experience) to learn to get along with the normally sighted people around me. This seems to emphasize the almost imperative necessity for the partially sighted person to live in a natural community environment. In school this means that the sight-saving class pupil needs every opportunity to mingle with children in regular classes.

Basic to all these problems, of course, is the factor of economic disability. We are only beginning to make progress in this line. Prob-

ably it is not my place to formulate a plan for a welfare program, but with this reservation in mind, I should like to make a few comments. From the educational standpoint there are certain requirements which I believe are fundamental to a good program. First of all comes an adequate medical set-up. This means regular and frequent ocular examinations and a school program which allows the sight-saving class instructor to follow medical recommendations. Adequate educational facilities and personnel to give the children as normal an educational experience as is possible would be next on my list. This implies not only formal subject matter and skills, it means that the teacher must be capable of dealing with the mental hygiene problems of her pupils. In other words, the sight-saving class program is, first of all, education. The sight-saving class instructor is a good teacher who adapts her program to the special needs of her children, but her goals are the same as those of any program. These are or should be the development of those factors which make for a well-rounded, emotionally stable personality—one who accepts his limitations, but who does not stop short of them. This would perhaps be more ideal than practical, except for the fact that many such school programs are actually getting results.

In Minneapolis at the present time the Sight-Saving Department

is developing a vocational program in the schools which seems to be a promising approach to the problem of economic dependence. The result of this program is a permanent placement percentage that is actually higher than the percentage for normally sighted high school graduates. This program involves a highly individualized review of records and vocational testing. It involves a very careful job analysis in relation to the individual student. During the last year of high school there is a very careful pre-vocational training and part-time placement on apprenticeship basis.

It is interesting to note that in reviewing the early school records of each student, it has been found that success or failure often appears

to depend on the teacher's handling of early school situations. This brings us to the possibility of orienting our educational program in relation to its vocational aspects. This does not mean a rigid pre-vocational program. It rather implies the application of progressive methods for the purpose of developing emotionally healthy, socially responsible adults.

I think I should summarize this material by saying that the needs of a partially sighted person center around the need for normal development in a natural environment. Any program which provides an artificial or segregated life would fail to meet this requirement.

—MILO GILLILAND  
St. Paul, Minnesota



## News of State Activities

THIS Section is devoted to the reporting of sight conservation activities carried on by official and voluntary agencies throughout the country. It presents information supplied by these groups, and serves as a medium for exchange of experiences. Only brief and timely items can be used, because of the limitations of space.

### District of Columbia

"An urgent need in the District of Columbia will soon be filled, since Congress recently appropriated funds for a full-time ophthalmologist on the staff of the Health Department.

"The new ophthalmologist is to serve part time in the school medical inspection bureau and part time in other bureaus of the Department of Health."

—*District of Columbia Society for the Prevention of Blindness, Washington, D. C.*

### Illinois

"The Illinois Society for the Prevention of Blindness had a heavy legislative program at the State Legislature this past winter. The sledding was heavy, but there was a happy ending.

"I. House Bill 70, which was sponsored jointly by the State Firemen's Association, Illinois Congress of Parents and Teachers, and the Illinois Society for the Prevention of Blindness, with the backing of the Chicago Tribune, was signed by the Governor July 1, 1941.

"This Bill does away with the retail sale of explosive fireworks. We were not able to have sparklers, snakes, red lights and other small combustibles included among those which were prohibited from retail trade. However, this may be done in the future. The Bill was violently opposed by the retail interests, who wanted to have small firecrackers included. This the sponsors refused to do and they were backed up in their stand by the Legislature.

"II. Appropriations amounting to \$389,350 were approved for sight-saving classes. This was an increase of \$55,450 more than the last biennium.

"The State Department of Public Instruction got \$13,000 to cover supervision for special classes in Illinois, which is the first time this has ever been included in the State program.

"III. The trachoma budget was reduced by \$6,370 because of the progress in the control of the disease in southern Illinois. This represents one of our quietest but one of our greatest victories. It is not often in these days that a project is carried on so successfully that it is possible to retrench as we have done on the trachoma budget this year.

"IV. The Glaucoma Clinic budget was added to the budget of the Illinois Eye and Ear Infirmary. This amounts to \$8,400 and represents an increase for a two-year period of \$3,400 above the original grant made by Colonel Sprague for the demonstration work on this project."

—*Illinois Society for the Prevention of Blindness, Chicago, Illinois*

### Minnesota

"The educational program of the Minnesota Society for the Prevention of Blindness and Conservation of Vision culminated this summer in the eye course for nurses and medical social workers offered at the University of Minnesota, sponsored jointly by the National Society for the Prevention of Blindness, the State Society, and the Minnesota Academy of Ophthalmology.

"The Executive Secretary has given several short talks before groups of student nurses in private hospitals and before county public health associations. An exhibit was shown, and a demonstration with an eye model was given at a county fair at the request of the agricultural association of that county."

—*Minnesota Society for the Prevention of Blindness and Conservation of Vision, St. Paul, Minnesota*

### New Hampshire

"*What New Hampshire Is Doing In General Education To Prevent Blindness.*—In order to promote interest in eyes and proper care of the eyes, the Sight Conservation Consultant of the State Department of Public Welfare has developed many promotional activities. Beginning with the department, she has given consultation service to staff members and given talks to the workers in the department's seven district offices, emphasizing the importance of eye examinations, especially for the preschool child, as well as the school child and adult, and the importance of carrying out the doctor's recommendations in each case.

"New Hampshire has an Interdepartmental Committee consisting of representatives from the State Board of Education, State

Board of Health, and the State Department of Public Welfare. This Committee has discussed the importance of eye care, pamphlets have been distributed, and greater awareness of eye care and more co-ordinated planning have resulted. The picture, 'The Nurse's Responsibility in Saving Sight,' was shown at one of the Public Health Institutes for Health and School Nurses. Since that time, the department has received many requests for the showing of this picture. In the past two years, the picture has been shown, accompanied by a talk and discussion, to the following:

"Four schools of nursing

Two groups of school teachers (high school and grammar school)

One Teachers College (100 pupils)

Pupils of High School (370)

Three graduating classes of schools of nursing

Private organizations which include, Grange, Parent Teachers' Associations, Rotary Clubs, Women's Clubs. Each group which has seen the picture seemed interested and in some instances questions were asked. The general feeling among the groups, however, was that they knew so little about the eye that they did not wish to ask questions. This makes us realize that more and more general education on eyes must be given.

There were meetings with Women's Clubs and Rotary Clubs where it was impossible to show the picture, and we regret this for we feel that there is a wealth of material to be given to the public in the film, 'The Nurse's Responsibility in Saving Sight.'

May we quote a teacher in one of our junior high schools, who said, 'It would be well for every teacher in the state of New Hampshire to see this picture, as it would impress upon one the importance of the eye and the important part the eye plays in school.' A man connected with the University of New Hampshire said in regard to the picture, 'It is one of the finest pictures I have seen on eyes and every child of high school age should see it.'

"We have met with representatives of the Lions Clubs of this district in order to integrate the services of the Clubs with the State's program for the blind and sight conservation.

"In January, 1941, House Bill No. 267, was introduced to the New Hampshire legislature to control the sale of fireworks in the state. A hearing was held in March before the Judiciary Committee and at that hearing the Department of Public Welfare was

represented. While the department did not sponsor the bill, we were extremely interested in it. The bill was put to a vote in the House in March, but was defeated as inexpedient to legislate. An attempt is being made to collect further data on eye injuries from fireworks so that at a future hearing of such a bill, this department will be better armed with telling facts."

—*New Hampshire State Department of Public Welfare, Concord, N. H.*

### South Carolina

"It has been stated that had a conservation of vision program been functioning in our schools when our present draftees were entering school, the rejections now being made for this cause would be negligible. The same may be said as to the general education of the public in the matter of eye health and certain eye conditions which terminate in blindness. Therefore, we must agree that any program for conservation of vision or prevention of blindness is a measure in the efficiency of our program for national defense, even viewed as military efficiency.

"Because of this belief, we have endeavored to include some educational features in our program. Lectures have been given at the University of South Carolina by leading ophthalmologists and members of our staff. During the summer school at Benedict College, where all students are teachers, our medical social worker spent a week lecturing to four classes a day, and also instructed a large number of teachers in the technique of taking vision. This was done upon the invitation of the director of the summer school, who was conscious of the fact that nothing had been done in the negro schools toward locating those children who may be facing blindness. Much interest was displayed in these classes and quite a number of students ordered Snellen charts in order that they may conduct screening clinics in their own schools another year.

"Talks have also been made to various other groups, i. e., areal meetings of directors of recreation, county staffs of the Department of Public Welfare, nurses, teachers, civic clubs, etc. There have also been radio talks given by members of our staff.

"As an additional educational feature, we have had booths at the Annual Conference of Social Workers and the State Annual Association of Nurses, at which educational posters were displayed and informative literature distributed. We very definitely plan to extend the educational features of our program another year.

"Case-finding has continued to develop through the usual sources of the Department of Public Welfare, the Department of Health, schools, interested individuals, attendance teachers and screening clinics.

"All cases are referred to the County Department of Public Welfare, which makes the necessary investigation to determine the ability of the client or family to furnish examination and whatever other services may be found necessary. They secure the visual acuity and as the Division only offers medical service to those who cannot afford it themselves, and whose vision is as poor as 20/70 or who have some other obvious existing condition, the number of cases given medical service by the Division is considerably less than those originally referred to it.

"Because of the fact that more cases are being referred to the Division, it has not been deemed necessary to conduct screening clinics as a case-finding procedure though this is an excellent means of interpreting to schools, communities, and to the people themselves. The clinics held were for those cases which were to be followed up through other sources than that of the Division.

"One clinic was conducted in the city schools of Orangeburg, the Lions assuming the responsibility of having the examinations and necessary treatment given those children whose vision was found to be as poor as 20/70, or who had some other obvious condition and whose parents were unable to supply this service. We have just received additional reports on clinics held in Orangeburg County last year, showing that, through efforts of the attendance teacher, 90 children who had previously been tested by the Division had been given necessary treatment through local resources.

"A screening clinic was given for the persons living on Allendale Farm; all necessary treatment will be cared for by Allendale Farm Project.

"We have also conducted a screening clinic for the York Church Home Orphanage; the orphanage will be responsible for all necessary treatment of children who were found to have sufficiently low vision to warrant this service.

"There has been a helpful continuation of the co-operation of Cedar Spring, State School for the Blind, and we feel that the Division and the School are of great assistance to each other in the matter of assisting the children in the state. All new applications for entrance to the school have been referred to the Division for examination and recommendation. This procedure has been made a prerequisite for entrance to Cedar Spring by the Board, upon the recommendation of Mr. Walker, Superintendent. Both the school and our Division are thus assured that no child enters the school until he or she has had an ophthalmological examination and has received every possible treatment which might restore vision. The economic as well as the social value of this co-operation is most important.

"As has been our custom, we have continued to work with the Division of Public Assistance, which Division administers aid to needy blind. Our medical social worker studies their medical records and interprets the medical implication to the Chief of the Division. Those cases which are found ineligible for assistance because their vision is better than 20/200 are referred to the Division for the Blind for whatever medical service may be necessary. There were eight cases whose visual acuity ranged from 20/200 to 6/400, but whose vision could be considerably increased with necessary glasses. In each of these cases the Division for the Blind secured the glasses, which in some instances brought their vision up to normal; in other cases, while not normal, useful vision was given.

"The Division for the Blind has been responsible for 119 operations with the following result:

Operations which resulted in preventing blindness.....	38
"    "    "    " restoring vision.....	61
in which there was no improvement at all....	6
in which the prognosis is doubtful.....	1
Operations which have been performed but ultimate results have not been obtained.....	13

"Before concluding this report, we would like to mention briefly something of our study in causes of blindness in the State. This study gives us little idea of the causes, as it is very incomplete. However, the study we will undertake soon will be sufficiently detailed as to give a greater insight to the causes and will also include other data which will be of great interest. The four greatest causes of blindness in the state are as follows: cataract, leading cause; optic atrophy, second; keratitis, third; glaucoma, fourth."

—*Division for the Blind, State Department of Public Welfare, Columbia, S. C.*

## Tennessee

"*Sight Conservation Activities in Tennessee.*—On July 1 the Sight Conservation Service completed its third year of service. During this period the Service has been engaged in the following nine activities: various surveys of the blind of the state to determine the prevalent causes of blindness; prevention of blindness to citizens of the state; the restoration of sight to citizens of the state; the finding of children eligible for sight-saving classes; the establishment of sight-saving classes; the establishment of visual corrective programs; the education of the public in preventing blindness; the enactment of suitable legislation to assist in preventing

blindness; and the development of financial resources in various communities.

"From its various surveys of the blind of the state during this three-year period the Service has collected 3,530 cases of blindness and partial blindness which, according to information available to the Service of there being between 4,000 and 4,500 blind persons in the state, indicates to the Service that its various surveys of the blind of the state are now between 78 and 88 per cent completed. According to the combined survey of this group the most important causes of blindness prevalent in Tennessee are as follows:

<i>Causes of Blindness</i>	<i>Number of Eyes</i>	<i>Percentage</i>
Cataracts (all types but traumatic) . . . . .	1,251	17.77
Injuries . . . . .	754	10.70
Sympathetic ophthalmia . . . . .	126	1.79
Hereditary eye conditions . . . . .	748	10.62
Acute infectious and contagious diseases . . .	611	8.67
Syphilis of the eyes . . . . .	512	7.27
Glaucoma . . . . .	481	6.83
Refractive errors . . . . .	392	5.56
Uveitis, etiology unknown . . . . .	360	5.11
Congenital defects . . . . .	281	3.99
Foci of infection . . . . .	220	3.12
Ophthalmia neonatorum . . . . .	219	3.11
Miscellaneous causes (corneal ulcers, cardio-vascular diseases, neoplasms, pterygia, etc.) . . . . .	544	7.61
Unclassified as to etiology . . . . .	561	7.85
Total . . . . .	7,060	100.00

"During the past three years the Service has found 183 children who, because of their serious visual defects, are eligible for enrollment in sight-saving classes. All of these children have had their visual defects corrected as far as possible through the efforts of the Service. The Service expects to find approximately 1,335 children eligible for sight-saving classes when this portion of its work is done, so the Service roughly estimates that this portion of its work is only 13.7 per cent completed. Of this group of 183 children, only 47 are, at present, enrolled in sight-saving classes. Enough children have been found in five communities, one being urban and four being rural, to make the establishment of a sight-saving class in each of these communities economically practicable but, at the present time, the Service has been unable to locate funds in these communities, or to make available from its budget funds for the establishment of these classes.



"Three sight-saving classes have been established in Nashville, two being in the city school system and one at the Tennessee School for the Blind; these care for the educational needs of 47 seriously visually handicapped children. One was established in 1938 in the city school system, one in 1939 at the Tennessee School for the Blind, and the other in 1940 in the city school system. Another class will be established in Chattanooga, and will begin operation in September of this year. When this latter class begins operation, it will bring Tennessee's total of sight-saving classes to five, one being in Memphis, three in Nashville, and one in Chattanooga. During this period five sight-saving class teachers have been trained, funds being made available for this purpose for two by the Centennial Club of Nashville, for one by the Sight Conservation Service and the National Society for the Prevention of Blindness, for one by the Tennessee School for the Blind and the National Society for the Prevention of Blindness, and for one by the Lions Club of Chattanooga. The Chattanooga Lions Club has also made available funds for the purchase of equipment for the Chattanooga class and expects to purchase at least a thousand dollars' worth of equipment for this class this summer. Three of our sight-saving class teachers will have their regular salary supplemented by funds made available by the State Department of Health from the funds available for special education, which fund is administered by the Crippled Children's Service of this state department.

"The need for visual corrective programs for indigent children of the ninety-five counties of our state was known to the Service in the very beginning, but the development of these programs did not begin until the last of the first year. Since that time, fourteen definite visual corrective programs have been established, but two have been discontinued. One of these programs was established during the first year of the Service, two during the second year and eleven during the third year, ten being with Lions Clubs and four with other organizations, these organizations being: a Big Brothers Organization, a Parent Teacher Council, a Kiwanis Club, and a Service League."

—*Sight Conservation Service, State Department of Public Health,  
Nashville, Tennessee*

## **Note and Comment**

**Society's Biennial Conference, December 4-6.**—The 1941 Biennial Conference of the National Society for the Prevention of Blindness will be held at the Hotel Astor, New York City, December 4, 5, and 6. A complete program will be available upon request after November 15. The topics which will be discussed during the three-day session are as follows:

### **Thursday, December 4**

- 9:30 A.M.—Mobilization of State Forces for Prevention of Blindness
- 12:30 P.M.—Prevention of Blindness from Glaucoma—Medical and Social Aspects (Luncheon Meeting)
- 4:00 P.M.—Annual Meeting  
Principal address by Dr. Frank G. Boudreau

### **Friday, December 5**

- 9:30 A.M.—Prenatal Factors as Causes of Blindness
- 10:15 A.M.—Restoration of Sight and Prevention of Blindness
- 2:30 P.M.—Eyes in National Defense—in Industry and in Military Service

### **Saturday, December 6**

- 9:30 A.M.—Medical and Educational Provisions for Partially Seeing Children in Rural Districts
- 11:00 A.M.—Summary and Forecast

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**Rules for Good Lighting.**—"Good lighting requires freedom from glare, the elimination of shadows, and the avoidance of sharp contrast between lighted articles and their background," writes the *Consumers' Guide*, publication of the Consumers' Counsel Division of the Department of Agriculture.

"Glare is misplaced brightness. It can usually be minimized by

shading the light bulb with a material that softens the light, and by placing the light well above the level of the eyes. Milk glass or plastic bowls are anti-glare; so are shades made of parchment paper or light-weight, light-colored silks.

"Reflected light may cause glare too. Mirrors, pictures, table tops, glossy paper, shiny objects, may throw dazzling light into the eyes. Sometimes you can just remove the offending object; sometimes it means covering a glass-topped table or a too shiny table top or desk.

"The darker the paint on your walls and ceilings the more light you need for seeing. Lightness of ceilings particularly is crucial where modern upward shining indirect lighting is used. Paint finishes on walls and ceilings should be dull. Dullness diffuses an easy, comfortable light while glossy finishes cause glare.

"Sharp contrasts in lighting come from a bright light that shines on an object in an otherwise dark room. The sharpness can be smoothed down by using general illumination in a room as well as a brighter light which shines on your book or your sewing or the children's lessons.

"Most lamps give both direct and indirect light, the direct light giving light right on what you are doing, the indirect light furnishing general illumination to cut down shadows and to round off sharp contrasts."

**Eye Hazards in Industry—Extent, Cause and Means of Prevention.**—Under this title a book by Louis Resnick, until his recent death Director of Industrial Relations of the Society, has just been published by Columbia University Press. The volume, completed just three days before Mr. Resnick's death in March, 1941, contains a complete summary of eye hazards existing in American industry today, and is based upon two decades of experience in this field.

Approximately 300,000 eye injuries occur in this country's factories, mills, mines, and workshops every year, the author explains, and cost the employers more than \$100,000,000 annually. They cost the injured workmen and the communities in which they live an additional \$100,000,000 yearly. To quote:

"Most of this \$200,000,000 annual loss and most of the human suffering resulting from these eye injuries—98 per cent, in the

opinion of those who have made the most detailed study of the subject—are wholly unnecessary.

Of the 1,000 eye injuries which will occur today, all but 20 could be prevented. Conditions observed during the past twenty years in American factories, railroads, and other work places lead inevitably to the conviction that accidents are not inherent in industry, and that the dividends on investments in accident prevention may be proportionately greater than the dividends on the primary business of an industry.

There is no need for the blinding of workers in American industry. The industrial accident and disease hazards affecting the eyes are now commonly known. Methods of eliminating these hazards or of protecting workers against them have been thoroughly demonstrated. Devices which provide protection against almost every type of eye accident are now available.

There are in the United States today more than 80,000 persons who have lost the sight of one eye as a result of industrial hazards and close to 8,000 who have lost permanently the sight of both eyes as a result of these accidents. To this total there is probably added each year 1,000 more who lose the sight of one eye and a hundred or more persons who lose the sight of both eyes as the result of occupational hazards.

The number of men and women who have lost permanently part of the vision of one eye or of both eyes as the result of industrial accident or health hazards undoubtedly runs into hundreds of thousands, and this total is augmented each year by a number probably in excess of 10,000.

These are conservative estimates even if it is assumed that the records on which they are based represent a complete reporting of industrial eye injuries. We know, however, that the injuries reported are only a part of the total number of eye injuries which actually occur. In many instances the injured worker does not know he is entitled to compensation, and no one enlightens him.

Often the seriousness of an eye injury or the fact that it has or will result in permanent loss of vision does not become apparent until long after the injury has occurred, and in many such cases, for one reason or another, no official record of the accident is made. In still other cases the worker is more concerned about the security of his job than in possibly compensation for an injury, and so he does not press his claim for compensation.

More serious than all the foregoing among the factors contributing to the inadequacy of official records of eye injuries is the rapidly spreading use in industry of poisonous chemicals and other deleterious materials which cause damage to the eyes. In many instances neither the workman whose eyes have been affected nor

his physician knows that the worker has been exposed to poisonous fumes, liquids, or dusts.

In many other cases damage to the eyes develops after the worker has left the employment of the company in which he, knowingly or unknowingly, worked with or near poisonous substances. In either event the true cause of blindness or of other serious damage to the eyes does not become a matter of record in the state industrial commission or in any other source of data concerning industrial injury or diseases.

Of the estimated 300,000 eye injuries occurring in American industry each year, 60,000 are compensable, and cost the employers more than \$20,000,000 annually for compensation and medical care, Mr. Resnick's study reveals.

Accepting the ratio of hidden or indirect costs of industrial accidents to direct costs of compensation as four to one, the total annual cost of compensable eye accidents amounts to \$100,000,000, according to the report, which adds that all or most of this sum is ultimately paid by the consumer, the public at large. On this subject the author wrote:

"Some further idea of the huge financial loss resulting to employers and employees from preventable eye injuries lies in the fact that eye injuries lead to the loss of more than 53,000,000 man-hours of work yearly.

"Little progress has been made in bringing to workmen a realization of what accidents cost them in lowered earning capacity and of the money saving they can make by doing their part in safeguarding their eyes. Few workmen, for example, realize that the maximum compensation for total loss of vision of one eye is less than \$2,000 in most states, and as low as \$1,000 in some.

"How many American workmen would be willing to sell both eyes for \$6,000 or less, the maximum compensation payable for loss of sight of both eyes in a majority of states? Few workmen realize that they are risking a  $33\frac{1}{3}$  per cent cut in salary for the rest of their lives every time they risk an eye injury. In the most liberal states the maximum compensation paid for total loss of vision is two-thirds of the wage received by the injured workman at the time of the accident. In some states, as in Oregon, the maximum compensation for total loss of vision is as low as \$30 a month for life.

"Practically all the financial loss and the human suffering resulting from the blinding of industrial workers could be averted by the co-operation of employers and employees in the utilization of dem-

onstrated methods of preventing accidents and diseases. Not only would these losses be averted but also efficiency and the earnings of both employers and employees would be substantially increased if all industry did what is being done successfully in a few plants in America to prevent eye injuries.

"The obligation to put into effect the methods, devices, and practices which experience has demonstrated to be successful in protecting the eyes of workers belongs to many groups. It is an obligation first of all on the owners and managers of industry and on all their executives and sub-executives. It is a responsibility of employees individually and collectively through their labor union and other organizations concerned with the health and welfare of workers.

"It is an obligation of government administrators—Federal, state, municipal, and county alike. It is an obligation of public and private health and welfare agencies which have any contact either with industry or with industrial workers. It is most directly the responsibility of all those professionally concerned with or having an opportunity for the protection of eyes and of general health, including safety engineers, safety inspectors, industrial physicians, ophthalmologists, general physicians, surgeons, nurses, and local sight conservation agencies."

The book, 350 pages, including illustrations, charts and tables, may be ordered from Columbia University Press, Box D-824, 2960 Broadway, New York, N. Y. Price, \$3.50. A descriptive folder will be sent by the Society, upon request.

**Civil Service Lists Visual Acuity Requirements in Examination Announcement.**—It is of interest to note, in Form 154 of the U. S. Civil Service Examination for Teacher in Indian Community and Boarding Schools, that the visual acuity of the applicant is taken into consideration along with other physical abilities. The requirements are quoted herewith:

Vision must be at least 20/30 (Snellen) in one eye, glasses permitted, and at least 20/200 (Snellen) in that eye, without glasses; except that persons whose vision with glasses meets the requirement named above, but whose vision without glasses is less than 20/200 (Snellen) in that eye will be suspended, and they will not be eligible for appointment until satisfactory evidence has been presented to the Commission showing that there is no disease or defect of the eye other than an error of refraction.

**The Association for the Prevention of Blindness, Bengal.**—The Tenth Annual Report, for 1939–40, of this Association has recently arrived in our office. Census returns in 1931 showed a total of 37,399 totally blind in Bengal and the report states that, for every person blind, there are three partially blind. The Association is now sponsoring an actual count of the blind in villages by trained eye doctors, and at present the blind in four hundred villages are known.

The aims of the Association are fourfold: first, to educate the people by means of posters, pamphlets and lantern slides; second, to establish travelling eye dispensaries to tour the different districts in Bengal; third, to recommend legislation on compulsory vaccination, prophylaxis against ophthalmia neonatorum, notification of venereal diseases, regulations against adulteration of food and drink, and against quacks and indiscriminate advertisements; and fourth, with regard to training in ophthalmology, to make ophthalmology a compulsory subject in university curricula and to urge that facilities be given to general practitioners trained in ophthalmology to work in recognized hospitals and dispensaries. Although the Association has been successful in carrying out the greater part of the program, nothing so far has been accomplished with regard to the legislation but, as public opinion is being gradually aroused, it is hoped that advances in this line will be made shortly.

From the beginning it has been the ambition of the Association to operate five travelling dispensaries in the five divisions of the Province so that education and modern treatment might be brought to people in remote villages. Two have been in operation for several years, and in 1939–40 the government sanctioned a grant for three years to start another two under the auspices of the Association. The demand of the public is so great that one dispensary worked nearly a year in one district instead of the three months that were scheduled for its work. These dispensaries listed among the commonest causes of blindness glaucoma, cataract, keratomalacia, couching, smallpox, venereal diseases, corneal ulcers from paddy leaves, and dust not properly treated in time.

The Association also sponsors an Eye Examination and Lecture Unit, the activities of which are mainly preventive. Besides lec-



tures in the schools, the Unit last year carried out systematic eye examinations in 8 high schools and 3 orphanages. They examined 2,102 students; of these, 680 students (32 per cent) were found to have various eye defects.

The Association also has two different sets of slides for lantern lectures on care of the eyes and prevention of blindness, and the travelling dispensaries and the Eye Examination and Lecture Unit each possess a set of each. They also have a film, "Lamps of Life," publications printed both in English and Bengali, and posters to aid in their campaign of educating the public.

**Tests for Color Blindness in School Children.**—Testing for color perception in the school child is important in order that all children who are color blind may be guided regarding traffic signals, and later vocationally. One test is sufficient for the entire school period as color blindness is a hereditary defect which cannot be changed. The American Medical Association has recently advised that the Army has discarded both the Ishihara and Stilling charts for color-blind testing and now relies entirely on the old-fashioned skeins of yarn, and that the Medical Corps of the Army now uses the Holmgren yarn test. The New York State Division of Health and Physical Education suggests that schools follow this advice until more definite standards are developed.

**Eyesight in the British Army.**—The British Army, realizing the importance of careful attention to a man's eyesight, has called in some of the best ophthalmic specialists in the country and has made available all the latest scientific equipment to assist the ophthalmological branch of the R.A.M.C.

Most of the work is concerned with examining men for spectacles. In the Northern Command alone, over 4,000 cases are dealt with a month, states the *Optician*. Of the 19 age group, only five or six per cent were sent up for examination, but from the 35 age group as many as 20 per cent in some units needed attention. On the average, it has been found that glasses will give definite improvement to two-thirds of all men inspected.

Every soldier that needs glasses is provided with two pairs, in the event of breakage in action. As ordinary glasses cannot be worn with a gas-mask, since they prevent the face piece from fitting

tightly to the side of the face, soldier's spectacles are manufactured with thin, flat sides. Experiments have been made with plastic lenses, but it has been found that they are too readily scratched; further experiments are now being instituted to get plastic lenses with a harder surface.

**Eye Defects and Selective Service.**—A recent *U. S. Public Health Report* states that, of the 32 per cent of men rejected after physical examination by the Selective Service local boards, 18.6 per cent are rejected for defects of the teeth, 10.6 per cent for defects of the eyes, and 10.1 per cent for cardiovascular defects. Of the 13 per cent rejected at the induction stations, 13.3 per cent are rejected because of eye conditions. The groups of defects of the eyes and teeth, hernia, and over- and under-weight account for a considerably higher proportion of the total number of defects in the limited service classification than in the disqualified classification.

**March, 1941, Review in Demand.**—We should be glad to extend the subscription for a quarter of a year to any one who would return the March, 1941, issue of the REVIEW when finished with it. Our supply is completely exhausted, and the demand for this issue is heavy.

## Current Articles of Interest

**Vitamin B in Ophthalmology**, Clarence A. Veasey, Jr., M.D., *Archives of Ophthalmology*, March, 1941, published monthly by the American Medical Association, 535 North Dearborn St., Chicago, Illinois. The author briefly defines the various components of the water-soluble group of vitamins and reviews the ocular effects of avitaminosis B with respect to both clinical and experimental ophthalmology. Extensive references are cited. Dr. Veasey points out that benefit from the administration of vitamin B in ophthalmologic practice can be expected in cases of toxic amblyopia, retrobulbar neuritis, certain corneal conditions, Wernicke's disease and similar depletion syndromes, and possibly in cases of uveitis and chorioretinal involvement of unknown cause. Although there is ample evidence to show that administration of riboflavin will arrest cataracts in riboflavin-deficient animals, experience with man has failed to demonstrate that a similar effect occurs in the human being, with the possible exception of arrest of the swelling of the lens in cases of intumescent senile cataract.

Of the complex, thiamine relates to neuritis without degeneration; riboflavin deficiency leads to degeneration of nerve tissue; nicotinic acid is involved especially with relation to the skin and mucous membranes, cerebral symptoms and the eighth nerve; and the remainder of the complex undoubtedly plays a part in human nutrition that is as yet undetermined. He emphasizes the fact that the administration of one component of the vitamin B complex tends to deplete the supply of the others and therefore the administration of one fraction should be supplemented by the administration of the whole complex.

Dr. Veasey concludes that subclinical avitaminosis is widespread among persons of all classes and may have unsuspected clinical manifestations. He indicates that persons with ocular disease in whose cases the dietary history or the general symptoms suggest the possibility of vitamin deficiency should receive the benefit of vitamin therapy, either for a specific effect or as an adjunct to other treatment.

**Nonspecific Protein Therapy in Ocular Disease**, Theodore E. Sanders, M.D., *Journal of the Iowa State Medical Society*, February, 1941, published monthly by the Iowa State Medical Society, 506 Bankers Trust Building, Des Moines, Iowa. Although the use of foreign protein therapy as a general therapeutic measure has lost some of its former popularity, Dr. Sanders states that its use in ophthalmology has increased until it is now one of the most valuable procedures in ocular therapy. Foreign protein therapy has been found to be of greater value in inflammation of the uveal tract than in any other tissue of the body. It tends to shorten the course and reduce the permanent damage of many of these inflammations. In severe iritis and iridocyclitis, particularly in acute stages, the use of intravenous typhoid vaccine is almost routine, and lesions of gonorrheal origin seem to respond especially well to the therapy.

Next to iridocyclitis, the author states that foreign protein is most valuable in the management of ocular trauma. It has proved to be so effective in infected cases that an injection is often given as a prophylactic measure to apparently uninfected cases of perforating injury. This tends to abort the infection in the preclinical stage before it has an opportunity to develop. On the same theory it has been suggested that foreign protein therapy be used 24 to 48 hours previous to any intra-ocular operation. This method of treatment is also of value in cases of corneal ulcer, severe interstitial keratitis or phlyctenular keratoconjunctivitis, optic neuritis and retrobulbar neuritis.

Dr. Sanders states that foreign protein therapy is easy to use and not dangerous. Although innumerable substances have been used to cause the reaction, he at present is using only four agents: typhoid vaccine, typhoid antigen "H," milk and omnadin. The choice of the agent depends on the patient and conditions under which he must be treated. If the patient is in good health and in the hospital, typhoid vaccine is the method of choice, as a marked reaction is essential if the most benefit is to be received; if an effective but less marked reaction is desired, because the patient is not hospitalized or is not in good health, antigen H is indicated; in children under five years of age, milk is used; omnadin is used only in those cases in which all other agents are contraindicated. The author emphasizes the fact that large enough doses should be given

to cause definite general reactions, as the therapeutic results to be expected are in direct proportion to the degree of reaction.

**Measurement of Fusion Frequency of Flicker as a Test for Fatigue of the Central Nervous System**, Ernst Simonson and Norbert Enzer, *Journal of Industrial Hygiene and Toxicology*, February, 1941, published monthly, except July and August, by The Williams & Wilkins Company, Mount Royal and Guilford Avenues, Baltimore, Maryland. Although the importance of fatigue of the central nervous system from an occupational point of view has long been realized, only a few attempts have been made to develop suitable methods of investigation. As there is evidence that fatigue develops first in the sensory centers, from which it spreads to involve the whole nervous system, the authors chose as a method of investigating central nervous fatigue a study of a fundamental sensory function, the fusion frequency of flicker. This is that rate of successive stimuli (light flashes) which is just necessary to produce complete fusion and the same effect as continuous illumination. A known rotator arrangement was used so that the beam of light from an electric bulb was interrupted by a rotating disk with four identical openings. The speed of the rotator was increased until fusion occurred and was then measured by means of a stop watch and a revolution counter. The fusion frequency of flicker was determined in a group of hospital employes, whose work was the usual daily laboratory or office work in which muscular effort was negligible. Values at the beginning and at the end of the same working day, and in a different state of fatigue in the morning or evening on different days, were compared.

The authors cited several points of merit of this method of testing: the values could be reproduced with high accuracy; the method, although a subjective one, has the accuracy of an objective one; the subject does not know the significance of discriminating flicker nor the actual speed of the rotator as regulated by the experimentator; discrimination of flicker cannot be improved by training; and a minimum of co-operation is necessary, as the subject has only to say whether or not he sees the flicker.

## Book Reviews

THE EXTRA-OCULAR MUSCLES. Luther C. Peter, M.D. Third Edition. Philadelphia: Lea and Febiger, 1941. 368 p. ill.

There is no domain in ophthalmology which permits a wider approach to its problems than "The Clinical Study of Normal and Abnormal Ocular Motility"—the subtitle of the volume under review. The work, while addressed primarily to the physician who still regards himself a student approaching ophthalmologic problems, gives a refreshing and stimulating survey to the one who has achieved more complete mastery of the specialty. Unless engaged in teaching in a clinic or school the practitioner develops a routine which may have many short cuts. These will find in a careful perusal of Peter's work, suggestions of finer detail and newer technique which may supplement what have grown to be deficiencies in his own daily office methods. This reading will also emphasize the amount of detail involved, not only in the analyses of so-called "muscle cases," but still more in the orthoptic and non-surgical handling of the patient to achieve the larger percentage of successful outcome in these cases. Dr. Peter has elaborated on the various methods by which to reach a proper understanding of the imbalance problem in a particular case. Based on this will be the scheme or plan of treatment. That surgery is no longer the first or early choice, where formerly it was, goes without saying. But non-surgical treatment—"orthoptic training"—calls for such an amount of time that few busy ophthalmologists can be expected to carry this out personally,—it is a matter for a properly experienced technician or assistant. One gets an appraisal of the high value of this work by the evidence in its pages of the author's capacity for painstaking detail.

Very properly the volume covers: Part I, "Anatomy and Physiology"; Part II, "Heterophoria"; Part III, "Heterotropia or Concomitant Squint"; Part IV, "Paralytic Squint"; Part V, "Nystagmus or Talantropia"; and Part VI, "Surgical Technique."

In these chapters, where facts are agreed upon, but where the approach has been from different angles with some difference in

explanation, there appear necessarily some differences in technical nomenclature, but nowhere is the reader left without a proper grasp of the author's meaning.

Because the subject of neuro-otology, as manifested in vestibular nystagmus, has risen to so much importance, it is a valuable inclusion in this volume to have the chapter on "Nystagmus" (now designated Talantropia) include some informative paragraphs on this reaction, which should be familiar to all physicians and to the ophthalmologist along with the otologist and neurologist.

The chapter on "Surgical Technique" will be helpful to all readers as giving the author's methods, but more especially to those not in contact with ophthalmic clinics of the first rank.

The volume should be in the library, and deserves to be on the desk of students desiring to keep abreast of this important and yet growing field of work, and should be in the hands of the *equipped* ophthalmologist.

—JOHN E. BROWN, M.D.

CIVIL SERVICE IN PUBLIC WELFARE. Alice Campbell Klein. New York: Russell Sage Foundation, 1940. 444 p.

Those who in the past have hopefully watched the launching of plans for sight conservation under public auspices only to see the plans wrecked among the rocks and shoals of politics find the new development of state merit systems the most encouraging trend in Government today. The stability inherent in a well-run civil service system is a prerequisite to shaping an effective prevention of blindness program since such a program is always dependent on efficient public servants in both the departments of health and welfare. The amendment to the Social Security Act requiring that state personnel handling federal funds disbursed under the Act be selected by a merit system makes it important for all inquiring citizens to understand what constitutes a good merit system and how to get one.

In her recent book, too modestly described as a primer by Mrs. Klein, she gives a fairly comprehensive description of the accumulated experience of more than fifty years of civil service administration in this country. The writer has emphasized the basic principles, the essential elements for method of personnel selection for



public welfare services and how to safeguard it. The book is divided into two parts: the first entitled, "Civil Service, Its Functions and Procedures," which includes a chapter on Common Forms of Inroads on Merit Systems; and the second, entitled, "Where Social Work and the Merit System Meet." This section will be particularly useful to anyone who is collaborating with a civil service commission in developing examination questions as it takes up many practical aspects of testing for any field.

This book will be valuable to teachers and the students not only as a text but as a reference book. The style is clear and readable. The rather full table of contents and index make the material easily available. The bibliography makes the book a good stepping stone to further study of a well developed method not sufficiently understood.

—ELIZABETH G. GARDINER

**MODERN TRENDS IN OPHTHALMOLOGY.** Frederick Ridley and Arnold Sorsby. London: Butterworth & Co., Ltd., 1940. 699 p. ill.

This book is different. The authors' idea was to present modern trends in ophthalmology as they originate in the clinics of various countries, and for that purpose they have enlisted the aid of authoritative clinicians from three continents. The list of contributors is impressive. Much of the material is necessarily post-dated by articles in the current magazines, but the reader will have a satisfying feeling that the old textbook didactics have been clothed in modern dress. Although there is naturally a closer correlation with the basic sciences and with medicine as a whole, the main viewpoint is a practical one, and the reader need not fear any oversimplification of the special problems involved in ophthalmology.

There is no attempt to cover any subject exhaustively, but rather to present newer facts and interpretations.

The beginner would be better advised to acquaint himself with the broad canvas of his subject before trying to draw the picture with these new colors alone.

For the practicing ophthalmologist, however, the added highlights will give his subject a greater feeling of solidarity and relief. Glaucoma, for example, is discussed by different authorities in rela-

tion to general vascular disease, heredity, psychological factors, and the preglaucomatous state. One cannot read without questioning or revising his own concepts. Herein lies the greatest value of the book.

The material is divided into seven parts, as follows: (1) Ophthalmology in relation to General Medicine; (2) Diagnostic Procedures; (3) Refraction and Binocular Vision; (4) Physiology of Vision; (5) Some Newer Concepts in Pathology; (6) Treatment; and (7) Social Aspects.

Any further attempt to discuss the subject matter is frustrated by the wealth of material presented and by the different points of view.

The type is clear and the illustrations are excellent. Good indexing and references make the subject matter easy to find and to follow up.

—WILLIS S. KNIGHTON, M.D.

NEURO-OPHTHALMOLOGY—A Text Book and Work of Reference, R. Lindsay Rea, M.D. 2nd edition. St. Louis: C. V. Mosby Company, 1941. 600 p.

When the various specialties in the practice of medicine were developing in this country, the study and treatment of the affections of the eye, ear, nose and throat were, in some unaccountable way, grouped under a common head. However, since Helmholtz, through the invention of the ophthalmoscope in 1851, has made possible the study of the background of the eyes, and Förster, five years later, offered the means of estimating accurately changes occurring in the visual field, rapid strides have been made in the study of eye symptoms as they relate to affections of the cerebro-spinal nervous system and a greater inter-relationship between ophthalmology and neurology has been established. A neurological examination is no longer considered complete without a physical and functional ocular study, and we find today many of the neurological hospitals equipped with ophthalmic departments.

The recognition of the interdependence of diseases of the nervous system and the eyes has created a demand for books of reference and text books relating to these subjects. One of the most complete and readable text books of the kind was published in 1938 by Rea

and has recently appeared in a second edition. In this the author, rather than reconstruct the entire text of the original issue, which has met with encouraging reception, decided to supplement the text of the first edition by the addition of approximately 100 pages and thus bring the subject matter up to date.

The introductory chapters are devoted to the anatomy, physiology, motor structures and nerve supply of the eyes, and to the methods of examination. A concise description of the visual pathways and the cortical centers is given as a preliminary to a chapter devoted to the localization of lesions of the tract and brain through perimetric study. Ophthalmoscopic description of the normal fundus and changes significant of affections of the nervous system are given due consideration, particular attention being given the diagnosis and localization of brain tumors, cysts, abscesses and head injuries such as fractures, intracranial hemorrhage and aneurysms. In a separate chapter the author takes up constitutional diseases and affections of the nervous system as they are manifested in ocular signs. Tumors of the orbit and optic nerves are given special consideration, as are congenital abnormalities.

The entire subject matter of this attractive text book is handled in the careful and thorough manner which characterizes the works of our English contemporaries. The text is elucidated by 196 illustrations, consisting of well executed schematic drawings, some in color, and of photographs and reproductions of fundus pictures. Mention should also be made of the appended comprehensive bibliography.

The publication of Rea is one which should be found in the library of every one interested in ophthalmology and neurology, and which would also prove invaluable to the internist and general surgeon. The publishers, who have gotten out this volume in their usual efficient way, are to be congratulated in having secured the rights to this publication.

—ADOLPH O. PFINGST, M.D.

SOCIAL WORK YEAR BOOK. Russell H. Kurtz, Editor. New York: Russell Sage Foundation, 1941. 793 p.

*Social Work Year Book* opens its section on Blindness and Conservation of Sight by pointing out that the problems of welfare

work for the blind and work for sight conservation differ in so many respects that it is desirable for the two programs to be organized separately. The section then proceeds to show the different scope of each field and the necessity for each to be carried on by its own highly specialized personnel.

It seems regrettable, therefore, that the two programs are presented as one section of *Social Work Year Book*—the accepted “encyclopedia . . . of ‘organized activities in social work and related fields.’”

The scope of a program for the conservation of sight and prevention of blindness is presented with enviable conciseness by C. Edith Kerby, Statistician of the National Society for Prevention of Blindness. She comments on the major problems of prevention: the need for intensive research into etiological factors; the fact that one-fourth of blindness is caused by “infectious diseases”; the fact that accidents are responsible for nine per cent of blindness in children and thirteen per cent in adults; the large part played by general diseases causing blindness.

Suggestions for meeting these problems follow: adequate treatment for the arrest or correction of eye lesions; control measures for communicable diseases; co-operation of individuals with serious anomalies of the eye for the control of hereditary blindness; maintenance of general health and nutrition as the ounce of prevention which may protect the eyes from disaster.

It is brought out that prevention of blindness should be the responsibility of all existing community services, and organized prevention of blindness agencies should stimulate and co-ordinate these community efforts.

Miss Kerby has made an excellent digest of the mass of activities composing a well-rounded program for sight conservation. One wishes, however, that more of the growth of the program in relation to human and medical needs had been given.

—MARY HOPPER SPENCER

## Current Publications on Sight Conservation

**Note.**—The National Society for the Prevention of Blindness presents the most recent additions to its stock of publications. Except for the more expensive ones, single copies are sent free upon request. Unless otherwise specified, they are reprinted from THE SIGHT-SAVING REVIEW. New publications will be announced quarterly.

**359. Tell-Tale Eyes,** A. L. Kornzweig, M.D. 8 p. 5 cts. Discusses the eye as an indicator of conditions affecting the general health of the individual.

**360. Helping America by Saving Sight in Childhood, Through Integration of Services,** Theodore Haines Soule. 12 p. 10 cts. Shows how departments of health, welfare, education, and other agencies are integrated to conserve sight.

**361. Helping America by Saving the Sight in Childhood, Through Health Services,** Roger E. Heering, M.D. 12 p. 10 cts. Presents what already has been accomplished through health services in the conservation of vision movement.

**362. Children's Eyes,** Willis S. Knighton, M.D. 12 p. 10 cts. Discusses development of the eye, refractive errors, binocular vision, and eye diseases and injuries in childhood.

**363. I Live in a Sighted World,** Milo Gilliland. 8 p. 5 cts. Describes the experiences and problems of a partially sighted individual.

**D145. Visual Efficiency,** Henry A. Imus. 8 p. 10 cts. Describes the refractive, muscular, and nervous parts of the visual apparatus and discusses some structural and functional disturbances. Reprinted from *Hygeia*, April and May, 1941.

**D146. Strabismus in Children,** J. Conrad Gemeroy, M.D. 4 p. (\$1.00 per C; \$7.50 per M.) Discusses causes and treatment of this condition. Reprinted from *American Journal of Nursing*, May, 1941.

**D147. Eye Health in the Basic Curriculum,** Carrie H. McNeill, R.N. 4 p. (\$1.00 per C; \$7.50 per M.) Presents possibilities of integrating eye health teaching with other courses in the basic curriculum. Reprinted from *American Journal of Nursing*, September, 1941.

**D148. Observations on Eye-grounds of the Newborn,** M. Luther Kauffman, M.D. 8 p. 5 cts. Discusses results of examinations of over three thousand infants' eyes. Reprinted from the *Pennsylvania Medical Journal*, September, 1941.

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